MAHIDOL UNIVERSITY
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PROTOTYPE OF A CARD GAME FOR LEARNING AND PRACTICING CHORDS

A Creative work project/A production of teaching tool

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ABSTRACT

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The creative work project of “Prototype of a Card Game for Learning and Practicing Chords” aims to study methods for helping students in order to learn and practice chords effectively and actively, and the card games and teaching tools that are music related and non-music related. By combining the information and analysis from both studies, the playtest sessions took place, and the prototype of the game was developed. The prototype of the game consisted of card decks (67 cards in total: 21 Natural Note cards, 20 Accidentals cards, 21 Chord Hero cards, 1 Special card, and 4 Basic Chord Chart cards), tokens and game rule sheets. The product prototype had been submitted to be patented and trademarked. The prototype of the game hoped to obtain these following benefits: 1) students would learn music theory and chords better; 2) create a positive competition environment that urges the students to use their creativity and knowledge in order to solve the assigned problems; and 3) arduous music theory exercises or assignments are transformed into a game playing atmosphere that students can enjoy with friends and family.
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CHAPTER I

GENERAL BACKGROUND OF CREATING A PROTOTYPE OF CARD GAME FOR LEARNING AND PRACTICING CHORDS

Learning Musical Chords

The importance of learning chords cannot be denied for music students and musicians. It helps if music students and musicians have an understanding of the structure of chords, and how chords effect the overall theme of any particular piece or music (Ferris & Worster, 2013). Understanding the structure of chords is also a requirement for the entrance examination in most music schools, including the College of Music, Mahidol University, where the entrance examination policy for the undergraduate level requires students to submit the Thailand International Music Examination (TIME) prior to the admission process which includes preparation for music theory.

In many cases, learning chords is like studying mathematics, some students may experience difficulty understanding chords. Normally, music teachers need to find teaching methods or specific tools for students with different learning habits in order to help them fully understand the concept and structure of each type of chord.

Active Learning

Constructivist teaching approaches underlined that it is crucial for learners to be actively involved in knowledge construction, instead of passively receiving information (Jonassen, 1999). Bearing this in mind, it is also important to find meaningful and interesting means in order to attract learners into the process of creating knowledge. Playing Games is one of the most effective ways to make students learn actively, concentrate on the subject matter, and enjoy the process of learning (Piaget, 1962). Moreover, Prensky (2001) asserted that games are embedded with many meaningful characteristics, such as enjoyment, structure,
motivation, interaction, flow, outcomes, sense of achievement, challenge, creativity, story and emotion, et cetera. Board games and Card games are also educational games that are suitable for constructive teaching. The use of card games has been happening in teaching mathematics, science, etc. (Kordaki, 2015; Tong, Yang, Han, & Velasquez, 2014).

**Board Games and Card Games in Thailand**

The board games market is an interesting and growing market in Thailand. As of 2016, there are at least 50 board games cafés in the Bangkok metropolitan area (Tabletop Thailand, 2016). The lists of Board Games Cafés in Bangkok vary in different sources, depending on its target audiences. The Board Game Café is a place where people hang out with their friends and play tabletop games together. This kind of place seems to be increasingly more popular in Thailand, especially in Bangkok. Many online travel guides are starting to cover information about locations of Board Games Cafés on their websites (รวมร้านบอร์ดเกมคาเฟ่, 2014; Bell, 2016; Dulyachinda, 2016). On YouTube, there are also Thai board game channels which broadcast board game related videos that have been well-received by Thai audiences. For instance, the TVmunk Official has a show called “Board Game Night” and has an average view count of around 20,000-50,000 views on every video produced by them (from TVmunk Official of YouTube). Another example would be the Salmon House Channel, which has a popular show called “Board Jockey,” featuring many Thai celebrities. This show has an average view count of around 10,000-20,000 views per video (from Salmon House of YouTube). Given the rising number of the board game cafés in Thailand and the increasing attention from Thai media, this has shown that board games have been well-received by general audiences in Thailand, despite the fact that the majority of board games are not in the Thai language. Playing a board game with friends during leisure time could become part of a new life style of Thai people in the near future.
Not only are general audiences interested in board games, The National Science and Technology Development Agency of Thailand (NSTDA) has already created a board game “Xvolution,” which aims to teach children about dinosaurs in Thailand via a board game format (ปียณีร์ เกษสุวรรณ และ ดร. น้ำชัย ชีววิวรรธน์, 2016). The researcher believes that many institutions in Thailand will soon follow this trend, in one form or another.

Project Purposes

Traditionally, teachers teach music chords or music theory by simply sharing information. An appropriate and well-designed board game or card game for teaching music chords had not yet been developed. As of 2016, there are a handful of games created and produced by Thais in Thailand; however, no board games about music have been created, not counting musical games and toys for early childhood or young children (no official data has been collected; the list of Thai games varies depending on different sources). This situation is contrary, given the fast rising number of board game cafés and media attention in Thailand.

Emphasizing the music-related topic, this creative project created a product which anyone can play, if interested in the game. This project aimed to design a prototype of a card game for any music student and the general audience, from 3 years old to college age, in order to learn chords and obtain enjoyment at the same time. This project also endeavored to patent and publish the card game in the market, and become available for more music students and the general public.

Before creating the prototype, the project reviewed some card-based games and educational tools that were either music related or well-known in the card game genre, in order to get an idea about how to design a proper game for learning music concepts. This would also help the project understand the fundamental structure and flaws of creating a card game.
After examining all of the selected products, based on music chord theory, the project created the core mechanism of the game. It was hoped to obtain the following benefits: 1) students would learn music theory and chords better; 2) create a positive competition environment that urges the students to use their creativity and knowledge to solve the assigned problems; and 3) arduous music theory exercises or assignments are transformed into a game playing atmosphere that students can enjoy with friends and family.
CHAPTER II

CARD-BASED GAMES OR TEACHING TOOLS WITH MUSIC OR NON-MUSIC THEMES

Card Games and Teaching Tools

Some selected card-based games already published in the market, which would benefit or relate to the project, will be discussed in this chapter. Many card games are available to be purchased; some are solely for entertainment, and some are intended to support education. This project reviewed and examined the core idea, product designing, and the game structure of 10 products that would benefit the development process of a card game for learning and practicing chords. It should be noted that some products reviewed by the project do not claim themselves as a game, but, they involve the participation of using cards; these type of products were considered as an educational tool and have been reviewed and examined in this study to help develop this project. To summarize, the reviewed games and tools are either:

1. A card-based game that is solely for entertainment with an interesting core mechanism; OR

2. A card-based game or a card-based tool that aims to support music education.

In terms of mechanism, types of board games in the market include dice-based games, figure-based games, pen-and-paper games, card-based games, et cetera. (Silverman, 2013). Card-based games are games with cards as the primary game element. Games like this usually have a main theme. The advantages of card games include easy to understand, require less time for setting up the theme, and the price is normally more affordable. For this project, the main theme is music chords and the main purpose is helping students with learning. Thus,
the researcher decided to review the following card-based game as their theme and mechanism are similar to the core concept of this project.

**Music Related Games and Products**

Several games that were based on music related themes were reviewed.

**Timeline: Music and Cinema**

This game is a card game with 110 cards designed by Frédéric Henry (2013). Although it is for 2-8 players, the game also allows only one player to play the game as well (Henry, 2013, p. 1). The concept of the game is simple, yet interesting. All the cards in the game have a specific time (year) on the card. Players have to place the card on the correct “point in time” in the space between cards to complete the correct timeline. The first one who does not have any card left on the table wins the game (Henry, 2013, pp. 1-2).

As shown on the cover, this game focuses on two specific genres, music and cinema. In fact, there are also other specified genres for this game, such as Timeline: American History, Timeline: Historical Events, and Timeline: Inventions (Asmodee, 2016), which means that the game has a well-developed core mechanism which could be used as the formula for many other specific genres that involve timeline.

Although the game has an outstanding design, the game does not give much detail on the music and the cinema genre. The cards in the game provide only the name of a musical piece or movie, the name of the music composer or musician or movie director, related picture, and the year when the music or movie was published. For instance, the card of the Bohemian Rhapsody by Queen features only the name of the song (Bohemian Rhapsody), the band (Queen), a picture of a singer and a guitarist (assuming those are Freddie Mercury and Brian May), and the year when the piece was released (1975). The card of the Carmina Burana also features only the name of the piece (Carmina Burana), the composer (Carl Orff),
a picture of the composer, and the year when the piece was composed (1935). The game may help players to see the overall timeline of music and cinema, but from a music education aspect, the game does not provide adequate information about the selected musical pieces.

**Compose Yourself: Start Writing Original Music in Minutes!**

Designed by Philip Sheppard, this product is considered as a music education tool, since the product itself does not claims it as a game. However, it still requires the participant’s imagination when using the product.

The product has 60 transparent music cards: 30 types (2 of each). On the cards are music notation figures similar to modern western musical notations (5 staves and notes with its rhythmic values) without a clef. As the card is transparent, it can be flipped and turned upside down, meaning that each card has 4 different varieties. The possible combinations of using all the cards to compose music is vast. In addition to the participant being able to use the cards to compose music, they can also register the code number on the cards online to listen to their own composition, and save and print their own composition(s) directly from its website (Compose Yourself, 2016).

The core concept of this product is rather interesting; it encourages the non-musician to compose new music with combinations of cards and also to be able to listen it online. However, the product requires internet to create his/her own account and get the true benefit of the product, which means the product itself cannot serve its full potential functions by using only the cards in the package. On the other hand, to achieve the core idea of the product, physical cards are not necessarily required. Also, owing to the fact that the card itself has only the music notations without any musical clef, the participant can only compose the direction and rhythm of the music, not with the actual pitches.

**Tonic: The Card and Dice Game for Musicians**
The Tonic game and the Compose Yourself product share the similar concept of requiring players to use their imagination to create music. The difference between the two is that the Tonic game is designed for musicians as the product claims that it is “a ‘game’ only in the loosest sense of the word” (Hughes, 2015, p. 1). The game has a set of 70 cards and three 12-sided musical dice to let the musician interpret and make music out of the provided materials. Therefore, the game requires lots the knowledge about music, such as pitch, note, interval, phrase, shape (of a melody), groove/ostinato, intensity, chord, scale, and octave (Hughes, 2015, p. 1). Some of the cards are professional musical terms that might sometimes require interpretations. Thus, non-musicians may find it hard to play this game. The instruction of how to play the game is also somewhat limited by only including the explanation of the concept of the game and types of cards, since the game intended to encourage players to improvise the music loosely based on the instructions on the cards.

For musicians, this game is unique and very interesting. The idea of the game may stem from many contemporary composition techniques, and focuses those techniques on the cards instead of musical staff papers. Therefore, the variety of creating music is widened by chance (with cards and musical dice) and musicians’ own interpretation.

On the other end of the spectrum, while the game is strongly focused on the musician’s own interpretation and imagination, but, the game has no score/concrete objective, thus resulting in a lack of a competitive element between players or against the game itself in the game (Hughes, 2015, p. 1). Some people may not be interested in the game because of the lack of challenging objectives. Nevertheless, as a tool to help musicians overcome their own creative blocks, overwhelmed feeling and performance anxiety, or as the approach to start playing music together (as claimed by the product itself), this game is one of the best alternative music education tools in the market (Hughes, 2015, p. 1).
Measure Up!

Designed by Kasia Hugo and Ania Bhandari (2004), “Measure Up!” is a competitive card game for 2-4 players and features 56 cards with 16 time signature cards, and 40 note/rest cards. The objects consisted in the game are fairly simple, yet effective. Players have to use cards to complete musical bars in order to gain points (Hugo & Bhandari, 2004, p. 1). The game uses the word “ticks” to refer to two or more cards that make up a full bar (Hugo & Bhandari, 2004, p. 1). The core concept of the game is to help players to learn the meaning of four different time signatures (2/4, 3/4, 4/4, 6/8) and its associated rhythm and notes/rests by combining cards together. The game ends when a player has used all their cards, and the player who has the most points (by counting the number of cards placed on the table and subtracts the number of cards in a player’s hand) wins the game (Hugo & Bhandari, 2004, p. 2).

This game would be an excellent tool for non-musicians and music beginners to learn about time signature and the specific value of each rhythm and note/rest by filling out the space and by completing a musical bar. It is easy to understand and it gives enough information about music theory, meaning that it could also be considered as a musical learning tool. The other strength of this game is that the game focuses only on one musical aspect of time signature and rhythm, without involving any other aspects, such as musical notations, chords, and/or melody. This should help non-musician players to understand the aspect of music theory better, instead of giving lots of information at once. However, the game should have an option (or an expansion) for players to have more variety of time signatures, such as 12/8, 6/4, and/or even 7/8 for the advanced musicians or music theorists. Overall, this game is an excellent example of incorporating musical aspects and being developed it into a competitive card game.
This game, by Rafael Hernandez (2008), has 161 cards, the core mechanism is to use cards to compose phrases in order to score points and win the game (Hernandez, 2008, p. 1). There are many types of cards for composing the phrases and each type represents different roles in the game: Harmony cards (75 pieces), Special Harmony cards (11 pieces), Voice Leading cards (34 pieces), Part Writing Error cards (16 pieces), Cadence cards (17 pieces), and Style card (8 pieces) (Hernandez, 2008, p. 1). The drawing rules are similar to the ones from other standard card games in the market, which are: draw a card from either drawing deck or discard pile, do as many actions as he/she likes (according to the actions rules), and discard as many card as he/she likes at the end of the turn (Hernandez, 2008, p. 4). The scoring occurs when a player properly “locked” the phrase with a Cadence card (Hernandez, 2008, p. 5).

This is a fascinating game for teaching and learning harmonic progression. However, for non-musicians, the game seems to provide too much information at once, while the cards of each type have already provided lots of information for players to learn. For instance, the Harmony card features a Roman numeral (with the inversion, if applied), Grand function (Tonic, Sub-Dominant, and Dominant) with small Roman numeral indicates same type/degree that applicable, a diagram of the harmonic progression, and voice leading symbol(s) for placing Voice Leading card at the top and bottom of the card (Hernandez, 2008, pp. 9-10). Combining the Harmony cards with other types of cards in the game (which has a totally different layout for each type of cards) (Hernandez, 2008, pp. 9-16), this game may require a huge learning curve before mastering it, even for musicians.

After all, the game itself provides a good measure for players to learn and practice the harmonic progression and style; however, the game should start from a smaller scope first
and gradually provide more types of card and rules as expansions in the future to be friendlier to non-musicians to play the game.

Non-Music Related Games and Products

Five games that were based on music related themes were reviewed.

**Superfight: a game of absurd arguments**

The game features 500 cards, 160 characters (white-backed) cards and 340 of attribute (black-backed) cards (Ross, 2015). The rules are simple: 1) a player draws three white-backed cards and three black backed cards; 2) and then select at least one white-backed card and one black-backed card from one’s hand to form an argument with other players; 3) all the players in the game will vote for a player who would win the argument (Ross, 2015). Players can choose to play one-on-one against another player, one player playing as a villain against all other players in the game, or all players playing against everyone in the game (Ross, 2015).

This game is an excellent example of how a card game would encourage players to use his/her imagination to play as open-ended discussions with other players. There are not any pictures on any cards in the game; players have to rely solely on their imaginations to picture the characters and the situations in his/her mind. However, some people may dislike the game just simply because it lacks of any pictures in the game. Also, because the game is text-based, players who have limited knowledge of English language may not be able to play the game at all.

**Exploding Kittens**

This game claims that it is ranked number 1 on premises of both most-backed Kickstarter Project ever (219,000 people in early 2015) and also the most-funded game in
Kickstarter history (Lee, Inman & Small, 2015). The game features 56 cards for 2-5 players. Also, 2 decks can be combined to have up to 9 players in the game (Lee, Inman & Small, 2015). The core mechanism of the game is to use cards to create a “risk and reward” situation. The main feature of the game is the exploding kitten cards which would cause the elimination of a player if he/she draws that card. The others cards in the game are intended to help lessen the chance of getting the exploding kitten cards in the game.

The main twists of this simple game are: 1) instead of drawing a card at the beginning of the turn, each player has to draw a card at the end of the turn; 2) if that player draws the exploding kitten card and does not have a defuse card, he/she is out from the game. These two mechanism turns the game into “risk and reward” situation. Players have to guess the top card on the deck and decide whether to draw that card or use card(s) in his/her hand to try to avoid getting the exploding kitten card. This game not only has an excellent core mechanic structure, but is also a good example of how the game can teach players to make a wise decision within a tense environment.

UNO

The UNO game, one of the classics, features 112 card for 2-10 players. The game has very simple objectives: winner is the first player to get rid of all of his/her cards and score points for the cards left in other players’ hand (Walsh, 2005, pp. 223-224; Robbins, 2015). Each card has specific points based on the number on the card and the specific type of card itself (Robbins, 2015). During a player’s turn, the player has to discard a card that matches (either the same color or the same number) the top card on the discard pile, otherwise the player has to draw a card from the deck and moves on to the next player (Robbins, 2015). There are many types of cards, such as the Draw Two card, the Reverse card, the Skip card, the Wild card, et cetera, that make players draw more cards or interrupt the discard action and
keep other players from winning the game (Robbins, 2015). These “special” cards are the
highlight of the game’s mechanism. The game clearly shows that it is based on an “easy to
understand” objective, and builds the structure around it. This is a good example of how a
simple objective can be developed into a fun structure.

**Love Letter**

The interesting fact of the game is that all the players have to use only a small number
of cards. This game features only 16 cards with 13 tokens, for 2-4 players. For this type of
“bluffing” game, a player has to guess what card is on other players’ hands and compare it
with the one that he/she has. Each turn, a player has to draw a card, and also discard a card;
also each card has an effect that must be applied when discarded (Kanai, 2012, pp. 10-11).
The round ends when the drawing deck is empty, or, only one player remains in the game; the
person who has the highest number in is his/her hand wins the round (Kanai, 2012, pp. 13-
14). The player who wins 4 rounds (for a 4-player game), wins the game (Kanai, 2012, p. 14).

The game is easy to understand, and, it is amazing that the game requires only 16
cards to play. The other feature of the game, that should be noted, is the 4 reference cards for
each player in the game. The reference card has all the details of each character in the game,
and also a brief explanation of the game rules. This feature helps with the flow of the game
significantly, since the game relies heavily on its characters and their abilities. Having the
details of each character in front of the players is an excellent feature to help the game keep
moving forward at a reasonable pace. The mechanism of the game has also been modified to
other themes of fictions. For instance, Love Letter: Batman, changes all the characters into
ones from the Batman fiction series, with slight modifications in the game rules (Kanai,
2012).
Sushi GO!

The game is designed for 2-5 players and has 108 cards (Walker-Harding, 2014, p. 2). The core concept of the game is to “draft” cards in order to score the most points to win the game. The game has 3 rounds to play: players must put a card face-down simultaneously, in front of them, and pass the remaining card face-down to the left in each turn (Walker-Harding, 2014, p. 3). At the end of each turn, players have to reveal their cards, and plan accordingly to score most points in 3 turns (Walker-Harding, 2014, p. 2). The scoring system is based on each type of cards. For instance, the “Tempura” card requires a player to have 2 cards to score 5 points, or, the more “Dumplings” card a player has, the more points that player will have as follows: respectively, 1, 3, 6, 10, 15 points for 1, 2, 3, 4, 5 dumplings card(s) that a player has.

This game is very simple to play, and also encourages players to use strategies to win the game. The mechanism of the game is also interesting, as players have to switch cards in their hand at the end of each turn. So not only does a player have to focus on his/her card, but also has to plan ahead by looking at other players’ cards on the table. This design is an excellent example of how to use the game’s own mechanism to encourage players to interact with each other more.

Comparing this game with Love letter, both games are considered as small games (so do Timeline, Exploding Kitten and UNO) and it is easy to play and does not require a lot of time to participate (approximately 10-15 minutes). Both games have a unique core mechanic mechanism that differentiates itself from other games in the market; however, beside its core mechanism, Sushi GO! features significantly more cards than Love letter: 108 cards compared to 16 cards feature in the game. This might be one of the main factors for
customers’ decisions to purchase either one of these games, in terms of the physical value of the products.

**Discussion on the Reviewed Games and Products**

After reviewing all of the selected products above, the researcher has found that the music related games (excluding Timeline: Music and Cinema) were primarily designed for musicians and music students. Those game designs seem to alienate players who are not interested in music as a subject. To have a successful music related game, the researcher believes, the games should be fun to play and also resonate with non-musician players as well. On the other hand, the non-music related games seem to focus on a simple goal or mechanism which is easy to learn, and fun to play. Also, players who play the games may passively learn some important aspects of the games as well. For instance, the Superfight game encourages players to use imagination and positive arguments to convey the ideas, and, the Exploding Kittens game encourages players to practice making decisions under pressure and even take a chance between risks and rewards.

After all, for creating a prototype of a card game for learning and practicing chords, the game should focus on the “fun” perspective first, and provide information of chord spelling, as an active learning approach.
CHAPTER III

PROJECT GOALS AND METHODOLOGY

Project Goals

After reviewing the related studies and publications in Chapter I and II, this project’s goals had been set as:

1. To create a prototype of a balanced card game with correct chord knowledge that could be well performed by any student card game player,

2. To create a prototype that helps attract students to learn chords better by playing card games,

3. To create a prototype that helps music major students be equipped with accurate cord knowledge to achieve better performances.

Project Topics

In order to achieve the goals above, the project were centered on the following topics:

1. The characteristics that a card game should have to become appropriate and effective in helping students to learn chords better,

2. The subject matters regarding musical chord could be learned or practiced by the card game,

3. The design of the prototype of the card game that could help students to learn and practice music chords better.

Project Procedures

By reviewing some publications and games, the first draft of the prototype was designed along with the first draft of the games rules. This prototype was later utilized as the
testing subject of the playtest sessions. The playtest sessions aimed to fix and improve the core mechanism of the game. In order to have a well-balanced game and theoretically accurate musical design for the final prototype that is ready for further production, three playtest sessions were taken place. The final prototype was ten designed after the last playtest session.

**Playtest Tools – the First Draft of the Game Design and Game Rules**

This project aimed to create a card game that helps general audiences, music major students and musicians to learn and practice writing chords. The purpose of designing this card game is to make the learning and practicing processes of building chords more fun. In short, the principal goals of creating the prototype are: 1. The game is fun to play; and, 2. The game and its basic chord writing functions are accurate from a music theory perspective.

**The general concept of the game**

In order to focus on basic chord writing, the game prototype, with the design of the cards and rules, is limited to triads spelling and the variations of major, minor, augmented, and diminished values. The type of card game is a positive competitive game for 2 to 4 players aged 10 years old and up. While encouraging players not only to focus on writing their own chords, but also to be aware of other players’ chords, this positive competitive environment created by the game should entice players to be more actively engaged in the theory aspect of the game and, as a result, teach the players about the variations of chords.

The basic concept of the game is players using cards to spell chords. The player who has the most chords, wins the game. From aspects of music theory and the nature of the chord(s) itself, the types of cards created for the game should enable the players to spell any variations of a chord correctly, and still leave space for creativity. The creativity in the game is mainly demonstrated by writing a chord and its value (major, minor, augmented or
diminished), and then changing that particular chord by adding accidentals. For example, in basic C major [C-E-G], if a flat is added to E, the value will be changed to C minor [C-Eb-G]; and, if another flat is added to G, the value will be changed to C diminished. The value of the same particular chord can be changed as many times as a player wishes by continuing to add accidentals (sharp, flat, natural, etc.). In this way, the possibilities of chord writing and value changing, focusing only on triads with variations of major, minor, augmented, and diminished, is nearly endless.

The designing process for the game was focusing on the general concepts above. Therefore, the first draft of the prototype started with including three card types, each representing different symbols with different functions.

The Types of Cards

The card deck of the game is the combination of three types of cards (as seen in Table 1); the number of each specific type of card was determined in the playtest sessions.

Table 1

*The types of cards in the first draft of the game*

<table>
<thead>
<tr>
<th>Natural Notes</th>
<th>Accidentals</th>
<th>Chord Heroes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Sharp</td>
<td>C Major Hero [C, E, G]</td>
</tr>
<tr>
<td>D</td>
<td>Flat</td>
<td>D Minor Hero [D, F, A]</td>
</tr>
<tr>
<td>E</td>
<td>Natural</td>
<td>E Minor Hero [E, G, B]</td>
</tr>
<tr>
<td>F</td>
<td>Double-sharp</td>
<td>F Major Hero [F, A, C]</td>
</tr>
<tr>
<td>G</td>
<td>Double-flat</td>
<td>G Major Hero [G, D, D]</td>
</tr>
<tr>
<td>A</td>
<td></td>
<td>A Minor Hero [A, C, E]</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>B diminished Hero [B, D, F]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accidental Lord [Sharp, Flat, Natural]</td>
</tr>
</tbody>
</table>
**Natural Notes.** The Natural Note cards consist of all seven natural notes, which are C, D, E, F, G, A, and B; one card represents the symbol of a note. The design of this type of cards allows the players to spell a chord by combining three different Natural Note Cards together. For instance:

- C + E + G = C major chord;
- D + F + A = D minor chord; and,
- E + G + B = E minor chord.

This type of cards is meant to be the core of the game, since the basic concept is using cards to spell chords. According to the game rules determined in the following sections, a player may use this type of card to spell chords only in his/her turn, but cannot add this type of cards to a chord already spelled in the game.

The design on each Natural Note card contains: 1. The name of the note and a Roman Alphabet letter at the center of the card, 2. The picture(s) of the keyboard with the name of the note as it appears on a keyboard instrument placed on the top and bottom of the card, and 3. Musical notations in both treble and bass clef of the note located to the left and right side of the card.
Incidentals. The Accidentals card type consists of five different musical accidental symbols, which are sharp, flat, natural, double-sharp, and double flat; each card is a representation of an accidental symbol. The design of this type of cards allows players to alter the note value, thus changing the entire value of that particular chord. For instance, in C major \([C + E + G]\), if E is changed to E flat by adding an accidental symbol \([\text{flat}]\), the chord becomes C minor. This type of card is designed to help players understand the concept of a chord’s value in major, minor, augmented, and diminished forms. According to the game rules determined in the following sections, a player may use this type of cards only in his/her turn to change the value of a chord and may add this type of cards to any of his/her spelled chords in his/her turn in the game.

The design of the Accidental card contains: 1. The name with the associated symbol of the accidental at the center of the card, and 2. The picture(s) of the keyboard on the top and bottom of the card.
Figure 2. First Draft of Accidentals card: sharp

**Chord Hero.** The Chord Hero Cards type features characters newly designed for this game. The traits of this type of cards is are the three slots on the right hand side of the card. Those slots are combinations of symbols of three natural notes, which allows players to select up to two (out of three) symbols to aid in spelling chords with other Natural Note Cards and Accidentals Cards in the game. The core concept of the Chord Hero Card type is to provide players with more flexibilities in order to spell chords in the game. If the game contains only Natural Note cards and Accidentals cards, the game may need excessive amounts of cards in order to cover all of the chords spelled for the game. Being named after a particular chord, each Chord Hero Card contains three symbols of notes that form this particular musical chord. Therefore, each Chord Hero card not only increases the flexibility and flow of the game, but also helps players know how each chord is formed. For instance, a C Major Hero Card contains symbols of C, E, and G; players can select up to two notes on the Chord Hero card (C-E, C-G, or E-G) and a Natural Note card (either G, E, or C) to spell a chord in the game. According to the game rules determined in the following sections, the functions of the
Chord Hero Cards are nearly the same as the three symbols on the cards if those are represented by three Natural Note Cards.

The design of the Chord Hero card contains: 1. Three slots with notes (in the form of its name) on the right hand side of the card, 2. The name and the picture with speech bubble(s) of the hero character associated with the chord formed by the symbols in the slots, and 3. The character’s traits in a brief description at the bottom of the card.

![Chord Hero Card](image)

*Figure 3. First draft of Chord Hero card: C Major Hero*

By combining those three types of cards, players should have enough materials (cards, in this case) to spell a wide variety of chords in the game. For instance, a player can use many combinations of cards to spell G major: 1. [G Natural Note + B Natural Note + D Natural Note], 2. [G Major Hero + G Natural Note (or B Natural Note, or D Natural Note], 3. [G Natural Note + C Natural Note with Flat Accidental + C Natural Note with Double Sharps Accidental], and many more combinations. It is up to the players’ creativity on how they want to spell each chord.
Creating the First Draft of Game Rules

The first draft of the general rules of the game had to be established at the very early stage of development, and had to be easy to follow and understand so that the project researcher could base on the general rules and move forward to enhance the structure of the game. At the very stage of making the first draft of the prototype, the researcher decided to utilize the following seven simple steps for players to start and follow in the game. The X represents numbers that were determined in the later playtest sessions.

General game rules.

1. When the game starts, shuffle the card deck and deal X cards to each player.
2. Pick a player to go first and play the game clockwise or counterclockwise.
3. At the beginning of each turn, draw X cards.
4. With the cards, a player can spell as many chords as he/she likes and announce the end of his/her turn.
5. The player must name the chord correctly when spelling.
6. A player must spell chords only during his/her turn(s).
7. The first player who spells X number of chords wins the game. Or, if the draw pile is empty, the player who has the most chords wins.

Except for the chord writing parts, these simple steps are similar to many card games in the market, such as Uno (Robbins, 2015) and Exploding Kittens (Lee, Inman & Small, 2015). Players who have the experience of playing card games should be able to understand the game rules correctly and only need to understand how to use the cards in this game to spell chords.

One of the unique aspects of the game is the set of special rules applied. These rules are newly invented to serve the purposes of the game, which are: 1. The game is fun to play,
and 2. The game and its basic chord writing functions are accurate from a music theory perspective.

**Rule of Enharmonic Attack.**

When a player spells a chord that is identical to (or enharmonically equal with) any prior spelled chords, all of those prior spelled chords belong to the player who last spells the identical (or enharmonically equal) chord. For instance, if a player spells a F major chord, all the chord(s) that are the same as (or enharmonically equal with) the F major chord belong to the player who last spells the F major chord.

This rule is designed to create a positive and competitive environment in the game. Not only does a player have to focus on how to use the cards in his/her hands to spell a chord correctly, but also he/she has to be aware of other players’ chord(s) in the game. A player may plan accordingly to use the enharmonic attack rule in order to take other player(s)’ chord(s), and thus increase his/her points or simply try to avoid having his/her spelled chord(s) receive an enharmonic attacked by other player(s) by changing its value in the game.

**Rule of Chord Police.**

Any player in the game can be a Chord Police. If a player names or spells a chord wrong, other players can correct it. That wrong chord belongs to the one who first corrected it.

If the misspelled chord is an invalid chord; those cards from the invalid chord now belong to the Chord Police’s hand cards.

The intention of this rule is to encourage the players to be aware of chord accuracy during both his/her turn and others’ turns by giving players the chance to take other(s)’ chords/cards. This rule also keeps all of the players engaging in the entire process of all chord
writings in the game, rather than only waiting for the chord result(s) from other players’
turns.

**Rule of Act of Kindness.**

Any player can use a Hero Card to request an exchange with another player (within
his/her turn). Upon negotiation, any type and amount of cards can be exchanged between two
players.

This rule is meant to add more variety into the game by giving an extra function to the
Chord Hero cards. Furthermore, this rule is reserved for the circumstance in which a player
who has Chord Heroes card(s) in his/her hands, but cannot write a chord or wants to
coordinate and/or use other special rule(s).

By using the 3 types of the general rules, and the special rules, the game is likely to
have enough material (in this case instructions) for the first playtest session.

**The Playtest Sessions**

In order to test the game rules, obtain feedback of the product design, check the
overall flow, modify the details along the way, and create a fun and well-balanced game, the
playtest sessions took place. During the playtests and the modifying process, it should be
noted, the core concept of the game “chord writing process” shall remain the same; however,
the rules, design, and flow of the product could be changed to support the core concept in
order to be further applied and adapted to the appeal of balance and competitiveness. The
creative work project hosted a total of three playtest sessions that lasted approximately 4 to 6
hours each. The results, comments and feedback of each session were noted and used for
improving the design and quality of the game. Table 2 shows the procedures of the entire
playtest, and the transitions between different prototype versions.
Table 2

*The overall procedure of creating the final prototype*

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Clarification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Prototype I</td>
<td>Creating prototype I (card designs and game rules) for the first playtest session</td>
</tr>
<tr>
<td>2. Playtest session I</td>
<td>Using Prototype I, and receive comments from the playtest team</td>
</tr>
<tr>
<td>3. Prototype II</td>
<td>Modify the cards and game rules, according to the comments received from Playtest session I</td>
</tr>
<tr>
<td>4. Playtest session II</td>
<td>Using Prototype II, and receive comments from the playtest team</td>
</tr>
<tr>
<td>5. Prototype III</td>
<td>Modify the cards and game rules, according to the comments received from the Playtest session II</td>
</tr>
<tr>
<td>6. Playtest session III</td>
<td>Using Prototype III, and receive comments from the playtest team</td>
</tr>
<tr>
<td>7. Final prototype</td>
<td>Modify the cards and game rules, according to the comments received from the Playtest session III</td>
</tr>
</tbody>
</table>

**Playtest Team**

As the principal goals of the game are: 1. fun to participate in, and 2. accurate with regard to music theory, mentioned in the previous chapter, the Playtest Team has to ensure that the game is correct from the music theory perspective, well-structured from the card
game perspective, and also appealing to general audiences (who have not been trained, or do not understand the concepts of chord writing). Therefore, the playtest team consisted of four people: the inventor, the music theory representative, the board game representative, and the general audience representative. Each person represented different perspectives of his/her field in order to cover every aspect associated with the game.

**Responsibility of each member in the playtest team**

**Inventor.** The inventor controlled the general direction of the game. The role of the inventor is to focus on the core concept of the game and to make adjustments to the prototypes I, II, III, and the final prototype from the results of the playtest session(s). The inventor was also responsible for explaining and ensuring that other members in the playtest team understood the concept and game rules correctly.

**Music theory representative.** The role of the music theory representative is to focus on the “music theory” aspect of the game. He/she is to check/compare the chord structure with the game rules, determine how much liberty of the game rules can be modified/adapted according to the music theory aspect, and provide comments about the game rules that would benefit the core concept of the game.

**Board game representative.** The role of the board game representative is to enhance the game in order to become appealing to players who mainly just want to play a game. The board game representative shall have the required experience in playing and testing many board games in order to be able to give insightful comments about the overall mechanism of the game. Thus, he/she can improve the “fun” aspect of the game in order to meet the standard of the board game for general audiences to play.

**General audience representative.** The role of the general audience representative is to ensure that the game would not alienate people who are not familiar with either music
theory or board games. Additionally, the general audience representative’s responsibilities also include giving comments on what kind of, and how much information should be provided in the game rule sheet in order to certify that the game rules are easy to be understood and would resonate with the general audience.

All members in the playtest team were encouraged to comment on all other possible aspects and issues, and worked as a team to spot any errors or problems of the prototype(s). The creative project was open to any type of comments. All comments given were well received and noted by the inventor who was in charge of modifying the game prototype(s) according to the results.

The members of the playtest team of this project were:

1. Dr. Juckrit Charoensook, Inventor
2. Mr. Cameron Kirk Rush, Music theory representative
3. Mr. Sumate Jinapun, Board game representative
4. Ms. Yi-Wen Chen, General audience representative

After deciding the procedures, tools and the materials, the playtest sessions were hosted and are described in Chapter IV.
CHAPTER IV

THE PROCESSES OF THE PLAYTEST SESSIONS AND THE DEVELOPMENT OF THE DRAFTS OF PROTOTYPES

Prototype I

Prototype I consists of all the types of cards that are mentioned in the previous chapter, namely: Natural Note cards, Accidental cards, and Chord Hero cards. In the first playtest session, the number of each type of card was varied as shown in Table 3. For future reference, this project refers to thus set of cards as [set 1].

Table 3

*Numbers of each type of card: [Set 1]*

<table>
<thead>
<tr>
<th>The Cards</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>4</td>
</tr>
<tr>
<td>D</td>
<td>4</td>
</tr>
<tr>
<td>E</td>
<td>4</td>
</tr>
<tr>
<td>F</td>
<td>4</td>
</tr>
<tr>
<td>G</td>
<td>4</td>
</tr>
<tr>
<td>A</td>
<td>4</td>
</tr>
<tr>
<td>B</td>
<td>4</td>
</tr>
<tr>
<td>Sharp</td>
<td>4</td>
</tr>
<tr>
<td>Flat</td>
<td>4</td>
</tr>
<tr>
<td>Natural</td>
<td>4</td>
</tr>
<tr>
<td>Double Sharp</td>
<td>4</td>
</tr>
<tr>
<td>Double Flat</td>
<td>4</td>
</tr>
<tr>
<td>Accidental Lord’s Knight [Sharp, Flat, Natural]; players can use one of the symbols on the card.</td>
<td>4</td>
</tr>
<tr>
<td>Accidental Lord’s Dad’s Knight [Double Sharp, Double Flat, Double Natural]; players can use one of the symbols on the card.</td>
<td>4</td>
</tr>
<tr>
<td>C Major Hero [C, E, G]</td>
<td>1</td>
</tr>
</tbody>
</table>
Generally, the main idea of [set 1] was to encourage players to utilize most of the natural note cards and accidental cards and to reserve the Chord Hero cards as the rare and special cards for changing the tide of the game. The result of [set 1] was determined in the playtest session I.

**Playtest Session I**

In the first playtest, the playtest team played and tried out the game, focusing on modifying the proper number of cards, game rules, and also the design of the cards itself. Each member got a handout (Appendix A) as the instructions and a chord chart (as seen in the Table 4) for referencing the writing of chords and consideration materials for the final product.

Table 4

*Chord chart; the root of the chords has no more than two accidentals*

<table>
<thead>
<tr>
<th>Major Chords</th>
<th>Minor Chords</th>
<th>Augmented Chords</th>
<th>Diminished Chords</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cb-Eb-Gb</td>
<td>Cb-Ebb-Gb</td>
<td>Cb-Eb-G</td>
<td>Cb-Ebb-Gbb</td>
</tr>
<tr>
<td>C-E-G</td>
<td>C-Eb-G</td>
<td>C-E-G#</td>
<td>C-Eb-Gb</td>
</tr>
<tr>
<td>C#-E-G#</td>
<td>C#-E-G#</td>
<td>C#-E-G##</td>
<td>C#-E-G#</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
<td>---------</td>
<td>--------</td>
</tr>
<tr>
<td>C##-E-G##</td>
<td>C##-E-G##</td>
<td>C##-E-G##</td>
<td>C##-E-G#</td>
</tr>
<tr>
<td>Dbb-Fb-Abb</td>
<td>Dbb-Fbb-Abb</td>
<td>Dbb-Fb-Ab</td>
<td>Dbb-Fbb-Abb</td>
</tr>
<tr>
<td>Db-F-Ab</td>
<td>Db-Fb-Ab</td>
<td>Db-F-Ab</td>
<td>Db-Fb-Ab</td>
</tr>
<tr>
<td>D-F##-A#</td>
<td>D-F-A</td>
<td>D-F##-A#</td>
<td>D-F-A</td>
</tr>
<tr>
<td>D##-F###-A##</td>
<td>D##-F###-A##</td>
<td>D##-F###-A##</td>
<td>D##-F###-A##</td>
</tr>
<tr>
<td>Dbb-Gb-Bbb</td>
<td>Dbb-Gbb-Bbb</td>
<td>Dbb-Gb-Bb</td>
<td>Dbb-Gbb-Bbb</td>
</tr>
<tr>
<td>Eb-G-Bb</td>
<td>Eb-Gb-Bb</td>
<td>E-G-B</td>
<td>E-G-B</td>
</tr>
<tr>
<td>E-G#-B</td>
<td>E-G#-B</td>
<td>E-G##-B##</td>
<td>E-G##-B##</td>
</tr>
<tr>
<td>E##-G###-B##</td>
<td>E##-G###-B##</td>
<td>E##-G###-B##</td>
<td>E##-G###-B##</td>
</tr>
<tr>
<td>Fbb-Abb-Cbb</td>
<td>Fbb-Abbb-Cbb</td>
<td>Fbb-Abb-Cb</td>
<td>Fbb-Abbb-Cbb</td>
</tr>
<tr>
<td>Fb-Ab-Cb</td>
<td>Fb-Ab-Cb</td>
<td>Fb-Ab-Cb</td>
<td>Fb-Ab-Cb</td>
</tr>
<tr>
<td>F-A-C</td>
<td>F-Ab-C</td>
<td>F-A-C#</td>
<td>F-Ab-C</td>
</tr>
<tr>
<td>F##-A###-C##</td>
<td>F##-A###-C##</td>
<td>F##-A###-C##</td>
<td>F##-A###-C##</td>
</tr>
<tr>
<td>Gbb-Bbb-Dbb</td>
<td>Gbb-Bb bb-Dbb</td>
<td>Gbb-Bbb-Db</td>
<td>Gbb-Bbb-Dbb</td>
</tr>
<tr>
<td>Gb-Bb-Db</td>
<td>Gb-Bbb-Db</td>
<td>Gb-Bb-D</td>
<td>Gb-Bbb-Db</td>
</tr>
<tr>
<td>G-B-D</td>
<td>G-Bb-D</td>
<td>G-B-D#</td>
<td>G-B-D</td>
</tr>
<tr>
<td>G#-B##-D##</td>
<td>G#-B#-D##</td>
<td>G#-B##-D##</td>
<td>G#-B##-D##</td>
</tr>
<tr>
<td>G##-B###-D###</td>
<td>G##-B##-D###</td>
<td>G##-B###-D###</td>
<td>G##-B##-D###</td>
</tr>
<tr>
<td>Abb-Cb-Ebb</td>
<td>Abb-Cbb-Ebb</td>
<td>Abb-Cb-Eb</td>
<td>Abb-Cbb-Ebb</td>
</tr>
<tr>
<td>Ab-C-Eb</td>
<td>Ab-Cb-Eb</td>
<td>Ab-C-E</td>
<td>Ab-Cb-Ebb</td>
</tr>
<tr>
<td>A-C#-E</td>
<td>A-C-E</td>
<td>A-C#-E</td>
<td>A-C-E</td>
</tr>
<tr>
<td>A#-C##-E##</td>
<td>A#-C#-E#</td>
<td>A#-C##-E##</td>
<td>A#-C#-E#</td>
</tr>
<tr>
<td>A##-C###-E###</td>
<td>A##-C###-E##</td>
<td>A##-C###-E###</td>
<td>A##-C###-E#</td>
</tr>
<tr>
<td>Bbb-Db-Fb</td>
<td>Bbb-Dbb-Fb</td>
<td>Bbb-Db-F</td>
<td>Bbb-Dbb-Fbb</td>
</tr>
<tr>
<td>Bb-D-F</td>
<td>Bb-Db-F</td>
<td>Bb-D-F#</td>
<td>Bb-Db-Fb</td>
</tr>
<tr>
<td>B-D##-F#</td>
<td>B-D-F#</td>
<td>B-D##-F##</td>
<td>B-D-F</td>
</tr>
<tr>
<td>B#-D###-F###</td>
<td>B#-D###-F##</td>
<td>B#-D###-F###</td>
<td>B#-D###-F##</td>
</tr>
<tr>
<td>B##-D####-F####</td>
<td>B##-D###-F###</td>
<td>B##-D####-F####</td>
<td>B##-D###-F##</td>
</tr>
</tbody>
</table>
The number of cards

The number of cards of [set 1] was prepared prior to the first playtest. However, soon after playing the game with the playtest team, it was obvious that the players had some difficulties writing the chords by mainly using the Natural Note and Accidental cards. The probability of successfully spelling the identical or enharmonically equal chords was quite low. The function of the chord hero cards also could not resolve or balance this problem, as the number of this type of card was far too few. Therefore, during this session, a card deck with a different set of cards [set 2] (as seen in Table 5) was created as an attempt to solve this particular problem. For future reference, this project will refer to the number of cards in this set as [set 2].

Table 5

<table>
<thead>
<tr>
<th>Numbers of each type of card: [Set 2]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Cards</strong></td>
</tr>
<tr>
<td>C</td>
</tr>
<tr>
<td>D</td>
</tr>
<tr>
<td>E</td>
</tr>
<tr>
<td>F</td>
</tr>
<tr>
<td>G</td>
</tr>
<tr>
<td>A</td>
</tr>
<tr>
<td>B</td>
</tr>
<tr>
<td>Sharp</td>
</tr>
<tr>
<td>Flat</td>
</tr>
<tr>
<td>Natural</td>
</tr>
<tr>
<td>Double Sharp</td>
</tr>
<tr>
<td>Double Flat</td>
</tr>
</tbody>
</table>
Accidental Lord’s Knight [Sharp, Flat, Natural]; players can use one of the symbol on the card. 5
Accidental Lord’s Dad’s Knight [Double Sharp, Double Flat, Double Natural]; players can use one of the symbol on the card. 5
C Major Hero [C, E, G] 3
D Minor Hero [D, F, A] 3
E Minor Hero [E, G, B] 3
F Major Hero [F, A, C] 3
G Major Hero [G, B, D] 3
A Minor Hero [A, C, E] 3
B Diminished Hero [B, D, F] 3
Accidental Lord * a hero card [Sharp, Flat, Natural] 3
Accidental Lord’s Dad * a hero card [Double Sharp, Double Flat, Double Natural] 3
Total 97

However, the probability of successfully spelling chords from using [set 2] was far too high. This resulted in players only being able to focus on spelling their own chords without paying attention to others’ chords, and making the Enharmonic Attack rule useless and meaningless. In this way, the prototype failed to encourage players to try their best to spell chords differently and creatively. Therefore, another new card deck, [set 3] (as seen in Table 6, was created as an attempt to overcome this particular issue. For future reference, this project will refer to the number of cards in this set as depicted in the following table as [set 3].
### Numbers of each type of card: [Set 3]

<table>
<thead>
<tr>
<th>The Cards</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>4</td>
</tr>
<tr>
<td>D</td>
<td>4</td>
</tr>
<tr>
<td>E</td>
<td>4</td>
</tr>
<tr>
<td>F</td>
<td>4</td>
</tr>
<tr>
<td>G</td>
<td>4</td>
</tr>
<tr>
<td>A</td>
<td>4</td>
</tr>
<tr>
<td>B</td>
<td>4</td>
</tr>
<tr>
<td>Sharp</td>
<td>4</td>
</tr>
<tr>
<td>Flat</td>
<td>4</td>
</tr>
<tr>
<td>Natural</td>
<td>4</td>
</tr>
<tr>
<td>Double Sharp</td>
<td>4</td>
</tr>
<tr>
<td>Double Flat</td>
<td>4</td>
</tr>
</tbody>
</table>

Accidental Lord’s Knight [Sharp, Flat, Natural]; players can use one of the symbol on the card.

Accidental Lord’s Dad’s Knight [Double Sharp, Double Flat, Double Natural]; players can use one of the symbol on the card.

- C Major Hero [C, E, G] 3
- D Minor Hero [D, F, A] 3
- E Minor Hero [E, G, B] 3
- F Major Hero [F, A, C] 3
- G Major Hero [G, B, D] 3
- B Diminished Hero [B, D, F] 3
Accidental Lord * a hero card [Sharp, Flat, Natural] 3
Accidental Lord’s Dad * a hero card [Double Sharp, Double Flat, Double Natural] 3
Total 83

The game with [set 3] was much more balanced. The Playtest team were able to spell chords fluently in a smaller number of chords, and were also gradually engaged in observing other players’ chords in order to make use of the Enharmonic Attack rule. At this point, it was clear that the problem which occurred in [set 1] was solved by increasing the number of Chord Hero cards; however, an obvious downside appeared because 83 cards is too many cards for a card game intended for 2-4 players. Therefore, the new card deck, [set 4] (as seen in Table 7), was created again as an attempt to lower the total number of cards in the game. For future reference, this project will refer to this set of cards as [set 4].

Table 7

*Numbers of each type of card: [Set 4]*

<table>
<thead>
<tr>
<th>The Cards</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>3</td>
</tr>
<tr>
<td>D</td>
<td>3</td>
</tr>
<tr>
<td>E</td>
<td>3</td>
</tr>
<tr>
<td>F</td>
<td>3</td>
</tr>
<tr>
<td>G</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>3</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
</tr>
<tr>
<td>Sharp</td>
<td>3</td>
</tr>
<tr>
<td>Flat</td>
<td>3</td>
</tr>
<tr>
<td>Natural</td>
<td>3</td>
</tr>
</tbody>
</table>
Double Sharp 3
Double Flat 3
Accidental Lord’s Knight [Sharp, Flat, Natural]; players can use one of the symbol on the card. 3
Accidental Lord’s Dad’s Knight [Double Sharp, Double Flat, Double Natural]; players can use one of the symbol on the card. 3
C Major Hero [C, E, G] 3
D Minor Hero [D, F, A] 3
E Minor Hero [E, G, B] 3
F Major Hero [F, A, C] 3
G Major Hero [G, B, D] 3
A Minor Hero [A, C, E] 3
B Diminished Hero [B, D, F] 3
Accidental Lord * a hero card [Sharp, Flat, Natural] 3
Accidental Lord’s Dad * a hero card [Double Sharp, Double Flat, Double Natural] 3
Total 69

The action of decreasing the total number of cards did not really workout as it was expected. The flow and flexibility of chord writing in the game was again limited. So, the overall number of the cards needed to be increased. However, after playing [set 1] to [set 4], the researcher noticed that players rarely used the Accidental Lord, Accidental Lord’s Dad, Accidental Lord’s Knight, and Accidental Lord’s Dad’s Knight. Those cards are all special cards for accidental symbols, which were easily been replaced by any Normal Accidental cards. The chord writing process in this game requires three notes to spell a chord, but the accidentals alone cannot form an actual chord and are intended for increasing the variety of chord writing. Therefore, the researcher decided to exclude all the cards mentioned from the
game and create the new card deck, [set 5] (as seen in Table 8), to help with the flow and flexibility of the chord writing process. For future reference, this project will refer to the number of cards in this set as [set 5].

Table 8

*Numbers of each type of card: [Set 5]*

<table>
<thead>
<tr>
<th>The Cards</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>5</td>
</tr>
<tr>
<td>D</td>
<td>5</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
</tr>
<tr>
<td>F</td>
<td>5</td>
</tr>
<tr>
<td>G</td>
<td>5</td>
</tr>
<tr>
<td>A</td>
<td>5</td>
</tr>
<tr>
<td>B</td>
<td>5</td>
</tr>
<tr>
<td>Sharp</td>
<td>5</td>
</tr>
<tr>
<td>Flat</td>
<td>5</td>
</tr>
<tr>
<td>Natural</td>
<td>5</td>
</tr>
<tr>
<td>Double Sharp</td>
<td>5</td>
</tr>
<tr>
<td>Double Flat</td>
<td>5</td>
</tr>
<tr>
<td>C Major Hero [C, E, G]</td>
<td>3</td>
</tr>
<tr>
<td>D Minor Hero [D, F, A]</td>
<td>3</td>
</tr>
<tr>
<td>E Minor Hero [E, G, B]</td>
<td>3</td>
</tr>
<tr>
<td>F Major Hero [F, A, C]</td>
<td>3</td>
</tr>
<tr>
<td>G Major Hero [G, B, D]</td>
<td>3</td>
</tr>
<tr>
<td>A Minor Hero [A, C, E]</td>
<td>3</td>
</tr>
<tr>
<td>B Diminished Hero [B, D, F]</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>87</td>
</tr>
</tbody>
</table>
[Set 5] was the best set so far. Players could spell chords smoothly, and were actively using other rules in the game. However, the number of the cards became higher again. Therefore, another card deck, [set 6] (as seen in Table 9), was created to limit the overall number of cards in the game by reducing the number of the natural note cards. The number of accidental cards remained in larger numbers in order to encourage players to use the Enharmonic Attack rule even more. For future reference, this project will refer to the number of cards in this set as [set 6].

Table 9

*Numbers of each type of card: [Set 6]*

<table>
<thead>
<tr>
<th>The Cards</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>3</td>
</tr>
<tr>
<td>D</td>
<td>3</td>
</tr>
<tr>
<td>E</td>
<td>3</td>
</tr>
<tr>
<td>F</td>
<td>3</td>
</tr>
<tr>
<td>G</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>3</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
</tr>
<tr>
<td>Sharp</td>
<td>5</td>
</tr>
<tr>
<td>Flat</td>
<td>5</td>
</tr>
<tr>
<td>Natural</td>
<td>5</td>
</tr>
<tr>
<td>Double Sharp</td>
<td>5</td>
</tr>
<tr>
<td>Double Flat</td>
<td>5</td>
</tr>
<tr>
<td>C Major Hero [C, E, G]</td>
<td>3</td>
</tr>
<tr>
<td>D Minor Hero [D, F, A]</td>
<td>3</td>
</tr>
<tr>
<td>E Minor Hero [E, G, B]</td>
<td>3</td>
</tr>
<tr>
<td>F Major Hero [F, A, C]</td>
<td>3</td>
</tr>
</tbody>
</table>
G Major Hero [G, B, D] 3
A Minor Hero [A, C, E] 3
B Diminished Hero [B, D, F] 3
Total 67

[Set 6] was the last experimental deck of cards in the first playtest session, and was the best set of cards in this playtest as well. The core principal of the game had been covered and the players could use the cards to spell a wide variety of major, minor, augmented, and diminished chords (triads) properly and fluently. However, from the comments of the playtest team, the prototype needed an improvement; that is, the game felt more like an exercise than an actual card game. Therefore, this comment along with others was used to develop prototype II.

Game Rules

Determine the solid numbers for the X marks in the game rules. In the first draft of the game rules (refer to chapter III), the X marks represents the numbers that are yet to be determined. The first X mark was the number of cards that will be dealt at the beginning of the game, which should match with the hand limit for each player. The researcher decided that it could be dealing 5 cards to each player at the beginning of the game, and limiting a player’s hand cards at 8 cards. While at least two cards are necessary to spells a chord, a player will be able to write a maximum of 2 chords to start the game and a maximum of 4 chords when a player reaches the 8-card limit. This design of number of cards allows players to plan accordingly, since players definitely have enough cards for a variety of chords to write at the very beginning of the game.

Result: Deal 5 cards, with 8-card limit on a player’s hand.
The second X mark represented the number of cards to be drawn in each turn. The playtest team was first playing the game by drawing only one card in each turn. The team found out that the game was dragged on knowingly and the players were not able to spell as many chord as expected or to spell at least one chord in each turn. During first turn, players actually were able spell many chords (up to 3 in a turn); but as the game went on, sometimes, no one was able to spell any chords during his/her turn. Then, the team played a new game that increased the number of drawing cards to 2 cards in each player’s turn. The game did flow much better in this way. However, the fact that no player discarding any card at the end conflicted with the rule of allowing players to take card(s) in the discard pile, which was added during the first playtest and will be explained later in this chapter. Therefore, the rule of a player discarding the cards at the end of each turn was added. Moreover, in order to balance the number of hand cards, the number of the drawing cards at the beginning of a player’s turn was increased to 3 cards. All playtest team members agreed with that this rule for drawing and discarding cards was the best for the process of the game. The team were able to play the game smoothly, and had a reasonable amount of cards in the discard pile to choose from. The rule, “Double Power”, of using cards in the discard pile will be further explained later.

Results: Draw 3 cards at the beginning of each turn and discard a card at the end of each turn.

The third X mark represented the condition(s) to win the game. In the first draft of the rule, the player who wins the game is the one who has the most chords at the end of the game. However, the game should not only encourage players to write as many chords as they can, but also encourage players to get the most benefit by changing the chords’ value. If the game focuses only on the number of chords, players will mainly use the natural notes and probably ignore all the accidentals cards in the game. The play test team suggested to change the
conditions to “who has the highest number of cards wins the game.” This rule would encourage players to use as many cards as they can, including accidental cards. Therefore, the researcher adopted this rule to the game.

After the first playtest, the researcher set the conditions of winning the game as follows: 1. Play the game until the deck is empty, OR 2. The first one who has spelled 5 chords first declares the final round; the rest of players will have another turn to spell chord(s). According to those conditions, the player who has the most chords win the game.

**Add an extra rule: Double Power**

As mentioned earlier, in order to allow the players to obtain more cards and increase the possibility of successfully spelling chords in the game, the rule of Double Power was added, which gave players the chance to use a card from the discard pile rather than using just the cards from the drawing deck. This rule was also the companion of the rule of discarding one card at the end of a player’s turn and the rule of discarding the cards exceeding the 8-card hand limit. To be more detailed, the rule “Double Power” let the player have the ability to take any card of their choice from the discard pile, by discarding any two cards from his/her hand in his/her turn. Gathering the desired cards had become easier because of this rule, since it expands the options of methods for obtaining cards and benefits the players who plan ahead and try to develop their own strategies.

**Updated rule: Enharmonic Attack**

In the first draft of Enharmonic Attack rule (refer to Chapter III), when a chord gets an Enharmonic Attack, that particular chord belongs to the most recent player who spells the identical or enharmonically equal chord. However, when the team were testing this previous rule in the playtest session I, either the game ended really fast, or the players had too many chords on table to keep tracking of. Therefore, the Enharmonic Attack rule was changed from
counting the taken chord as a chord to taken as cards instead; the taken cards are no longer considered as a chord. All the taken cards still belong to the most recent player who spells the identical or enharmonically equal chord and are put facedown underneath the chord.

According to this particular updated rule, the condition(s) for winning the game also has to be modified in the playtest session II.

Comments on the design of the product

During the first playtest session, the playtest team gave the following useful comments about the design of the cards, game rules, and the chord chart, which will be used to develop Prototype II.

The accidental card. How the card be positioned for spelling chords is a critical part of the game. The team suggested that the accidental symbols should be included on the left side of the piano keyboard to enable the accidental card(s) to be placed beside the Natural Note cards or Chord Hero cards when spelling a chord. The first design of the Accidentals card can be found in Chapter III.

Tokens. For the convenience of the players to read the spelled chords, the team recommended that the game should provide tokens to cover the unused note slot(s) on the Chord Hero card.

Chord Chart. Since beginners might need the assistance of the chord chart frequently while spelling the chords, the playtest team thought it would be ideal if the chord chart highlights the basic and easy chords to be easily seen in all the possible chords.

Special Card. From the aspect of creating a game, the playtest team addressed the necessity of creating a twist or incident to the game by adding a special card or Joker that might add intensity to the game.
Prototype II

After receiving all of the comments and feedback from the first playtest, Prototype II was modified and redesigned regarding both game rules and the cards itself.

Game Rules of Prototype II

Since the X marks had been determined in the first playtest, the game rules of Prototype II had the fixed numbers about dealing, drawing, discarding cards, and the number of cards to win the game. The game rules of Prototype II are described in the following paragraphs, which included extra and updated rules and was printed out on the handout as the instruction for the second playtest session.

General Rules.

*When the game starts, shuffle the card deck and deal 5 cards to each player.*

1) *Pick a player to go first and play clockwise or counter clockwise. The winner of the previous game can choose either to play first or last in the game.*

2) *At the beginning of each turn, draw 3 cards. At the end of each turn discard one card (of a player’s choice).*

*Each player has a limit of 8 cards in hands. At the end of each turn, if a player has more than 8 cards in his/her hands, discard all the cards (of a player’s choice) that exceed the 8 cards limit.*

*Players can use all the cards in his/her hands to spell chord(s), without discarding any card at the end of the turn.*

3) *With the cards, a player can spell as many chords as he/she likes and announce the end of his/her turn.*

4) *The player must name the chord correctly when spelling.*

5) *A player can spell chords only during the player’s turn.*
6) A player can use the accidental cards to change the value of a chord at any time in a player’s turn.

**Final Round.** The final round occurs when a player spells 5 or more chords, the rest of the players have one more turn to play.

The game ends immediately when the draw pile is empty.

**To Win the Game.** The player who has the most spelled cards (including all of the taken cards from enharmonic attack rule) wins the game.

**Enharmonic Attack.** When a player spells a chord that is same as or enharmonic with any prior spelled chords, all of those prior spelled cards (of that chord) now belong to the player who last spells the identical or enharmonic chord.

All of the taken cards belong under the chord that uses the enharmonic attack; put those taken cards facedown underneath the chord.

All the cards (including taken cards) that get enharmonic attacked belong to the recent player who spelled the chord using the enharmonic attack.

The taken cards are no longer considered as a chord.

**Double Power.** A player can discard 2 cards of any type to get a card from the discard pile during a player’s turn.

**Chord Police.** Any players in the game can be a chord police.

If a player names a spelled chord wrong; that chord belongs to the first player who corrects it.

If a player misspelled a chord (invalid chord/triad); those cards from the misspelled chord belong to the first player who corrects it.
Act of Kindness. A player can use a Hero Card to request an exchange with other players during a player’s turn. Upon negotiation, any type and amount of cards can be exchanged between two players.

The chord chart

The chord chart for the second playtest also needed an update. In the second playtest, there were two chord charts for the players to refer to: 1. The “advanced” chord chart (with the chords having no more than two accidentals on the root) highlighted all the basic chords (naturals on the root) to help players easily understand the overall structure of chord (Table 10), 2. The “basic” chord chart, which shows only the highlighted chords from the “advanced” chord chart (Table 11).

Table 10

Advanced chord chart: the root of the chords does not exceed two accidentals with highlights on the basic chords

<table>
<thead>
<tr>
<th>Major Chords</th>
<th>Minor Chords</th>
<th>Augmented Chords</th>
<th>Diminished Chords</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cb-Eb-Gb</td>
<td>Cb-Ebb-Gb</td>
<td>Cb-Eb-G</td>
<td>Cb-Ebb-Gb</td>
</tr>
<tr>
<td><strong>C-E-G</strong></td>
<td><strong>C-Eb-G</strong></td>
<td><strong>C-E-G#</strong></td>
<td><strong>C-Eb-Gb</strong></td>
</tr>
<tr>
<td>C#-E#-G#</td>
<td>C#-E-G#</td>
<td>C#-E#-G##</td>
<td>C#-E-G#</td>
</tr>
<tr>
<td>C##-E##-G##</td>
<td>C##-E-G##</td>
<td>C##-E##-G###</td>
<td>C##-E-G##</td>
</tr>
<tr>
<td>Dbb-Fb-Abb</td>
<td>Dbb-Fbb-Abb</td>
<td>Dbb-Fb-Ab</td>
<td>Dbb-Fbb-Abb</td>
</tr>
<tr>
<td>Db-F-Ab</td>
<td>Db-F-Ab</td>
<td>Db-A</td>
<td>Db-F-Ab</td>
</tr>
<tr>
<td><strong>D-F#-A</strong></td>
<td><strong>D-F-A</strong></td>
<td><strong>D-F#-A#</strong></td>
<td><strong>D-F-Ab</strong></td>
</tr>
<tr>
<td>D#-F#-A#</td>
<td>D#-F-A#</td>
<td>D#-F#-A##</td>
<td>D#-F-A#</td>
</tr>
<tr>
<td>D###-F###-A###</td>
<td>D###-F###-A###</td>
<td>D###-F###-A###</td>
<td>D###-F###-A###</td>
</tr>
<tr>
<td>Ebb-Gb-Bbb</td>
<td>Ebb-Gbb-Bbb</td>
<td>Ebb-Gb-Bb</td>
<td>Ebb-Gb-Bbb</td>
</tr>
<tr>
<td>Eb-G-Bb</td>
<td>Eb-Gb-Bb</td>
<td>Eb-G</td>
<td>Eb-Gb-Bb</td>
</tr>
<tr>
<td>E-G#-B</td>
<td>E-G-B</td>
<td>E-G#-B#</td>
<td>E-G-Bb</td>
</tr>
<tr>
<td>--------</td>
<td>-------</td>
<td>----------</td>
<td>--------</td>
</tr>
<tr>
<td>E-G###-B#</td>
<td>E-G###-B#</td>
<td>E-G###-B##</td>
<td>E-G###-B#</td>
</tr>
<tr>
<td>Fbb-Abb-Cbb</td>
<td>Fbb-Abbb-Cbb</td>
<td>Fbb-Abb-Cb</td>
<td>Fbb-Abbb-Cbb</td>
</tr>
<tr>
<td>Fb-Ab-Cb</td>
<td>Fb-Ab-Cb</td>
<td>Fb-Ab-C</td>
<td>Fb-Ab-Cbb</td>
</tr>
<tr>
<td>F-A-C</td>
<td>F-Ab-C</td>
<td>F-A-C#</td>
<td>F-Ab-Cb</td>
</tr>
<tr>
<td>F##-A##-C##</td>
<td>F##-A##-C##</td>
<td>F##-A##-C###</td>
<td>F##-A##-C##</td>
</tr>
<tr>
<td>Gbb-Bbb-Dbb</td>
<td>Gbb-Bbb-Cbb</td>
<td>Gbb-Bbb-Dbb</td>
<td>Gbb-Bbb-Dbbb</td>
</tr>
<tr>
<td>Gb-Bb-Db</td>
<td>Gb-Bb-Db</td>
<td>Gb-Bb-D</td>
<td>Gb-Bb-Dbb</td>
</tr>
<tr>
<td>G-B-D</td>
<td>G-Bb-D</td>
<td>G-B-D#</td>
<td>G-Bb-Db</td>
</tr>
<tr>
<td>G#-B#-D#</td>
<td>G#-B-D#</td>
<td>G#-B-D##</td>
<td>G#-B-D</td>
</tr>
<tr>
<td>G###-B###-D###</td>
<td>G###-B###-D###</td>
<td>G###-B###-D###</td>
<td>G###-B###-D###</td>
</tr>
<tr>
<td>Abb-Cb-Ebb</td>
<td>Abb-Cbb-Ebb</td>
<td>Abb-Cb-Eb</td>
<td>Abb-Cbb-Ebb</td>
</tr>
<tr>
<td>Ab-C-Eb</td>
<td>Ab-C-Eb</td>
<td>Ab-C-E</td>
<td>Ab-C-Ebb</td>
</tr>
<tr>
<td>A-C#-E</td>
<td>A-C-E</td>
<td>A-C#-E#</td>
<td>A-C-Eb</td>
</tr>
<tr>
<td>A#-C##-E#</td>
<td>A#-C##-E#</td>
<td>A#-C##-E##</td>
<td>A#-C##-E</td>
</tr>
<tr>
<td>A###-C###-E###</td>
<td>A###-C###-E###</td>
<td>A###-C###-E##</td>
<td>A###-C###-E#</td>
</tr>
<tr>
<td>Bbb-Db-Fb</td>
<td>Bbb-Dbb-Fb</td>
<td>Bbb-Db-F</td>
<td>Bbb-Dbb-Fbb</td>
</tr>
<tr>
<td>Bb-D-F</td>
<td>Bb-Db-F</td>
<td>Bb-D-F#</td>
<td>Bb-Db-Fb</td>
</tr>
<tr>
<td>B-D#-F#</td>
<td>B-D-F#</td>
<td>B-D#-F##</td>
<td>B-D-F</td>
</tr>
<tr>
<td>B#-D##-F##</td>
<td>B#-D##-F##</td>
<td>B#-D##-F###</td>
<td>B#-D##-F#</td>
</tr>
<tr>
<td>B###-D###-F###</td>
<td>B###-D###-F###</td>
<td>B###-D###-F####</td>
<td>B###-D###-F##</td>
</tr>
</tbody>
</table>
Table 11

Basic chord chart features all of the highlighted chords from the advanced chord chart

<table>
<thead>
<tr>
<th>Major Chords</th>
<th>Minor Chords</th>
<th>Augmented Chords</th>
<th>Diminished Chords</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-E-G</td>
<td>C-Eb-G</td>
<td>C-E-G#</td>
<td>C-Eb-Gb</td>
</tr>
<tr>
<td>D-F#-A</td>
<td>D-F-A</td>
<td>D-F#-A#</td>
<td>D-F-Ab</td>
</tr>
<tr>
<td>E-G#-B</td>
<td>E-G-B</td>
<td>E-G#-B#</td>
<td>E-G-Bb</td>
</tr>
<tr>
<td>F-A-C</td>
<td>F-Ab-C</td>
<td>F-A-C#</td>
<td>F-Ab-Cb</td>
</tr>
<tr>
<td>G-B-D</td>
<td>G-Bb-D</td>
<td>G-B-D#</td>
<td>G-Bb-Db</td>
</tr>
<tr>
<td>A-C#-E</td>
<td>A-C-E</td>
<td>A-C#-E#</td>
<td>A-C-Eb</td>
</tr>
<tr>
<td>B-D#-F#</td>
<td>B-D-F#</td>
<td>B-D#-F##</td>
<td>B-D-F</td>
</tr>
</tbody>
</table>

Redesigning the product

The second prototype included tokens for covering the unused slot(s) on the Chord Hero cards, for an easier reference to the actual chord spelled.

The Accidentals cards were also redesigned. In Prototype II, on the Accidentals card, a small accidental symbol was printed on the top-left of the card and upside-down on the bottom-right, next to the keyboard pictures. In addition, small arrows were also found underneath the symbols in both corners; an arrow pointed to the right means that the symbol will change the note a semitone up or sharp, and an arrow pointed to the left means that the symbol will change the note a semitone down or flat. With this rule, the double-sharp was noted with two arrows to the right, meaning changing two semitones or a whole tone sharp; the double-flat was noted with two arrows to the left, meaning changing two semitones or a whole tone flat.
It was also decided that one of the accidental cards, the natural cards of the Accidentals cards, to be excluded from the game. This is because, during the first playtest, this type of card was rarely used, and the natural symbol itself may conflict with the game rules and the core concept of the game.

Considering the result from the first playtest, the researcher decided to include a new character, The Lord of All Chords, into the game. Aimed to add intensity in the game, this card is a special (joker) card with the following characteristics and was tested during the second playtest.

- The card can be declared and used as any chord without adding any notes or accidentals.
- The declared chord is final; no extra card can be added.
- This card can be removed from the game, if preferred.
Updated numbers of cards in the deck

Combining the results, comments, redesigned version(s), and inclusion of a new card, a new combination of cards was developed as [set 7] for prototype II as seen in the following table. For future references, this project refers this set of cards as [set 7] which were tested in playtest session II.

Table 12

Numbers of each type of card: [Set 7]

<table>
<thead>
<tr>
<th>The Cards</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>3</td>
</tr>
<tr>
<td>D</td>
<td>3</td>
</tr>
<tr>
<td>E</td>
<td>3</td>
</tr>
<tr>
<td>F</td>
<td>3</td>
</tr>
<tr>
<td>G</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
</tr>
<tr>
<td>Sharp</td>
<td>5</td>
</tr>
<tr>
<td>Flat</td>
<td>5</td>
</tr>
<tr>
<td>Double Sharp</td>
<td>5</td>
</tr>
<tr>
<td>Double Flat</td>
<td>5</td>
</tr>
<tr>
<td>C Major Hero</td>
<td>[C, E, G]</td>
</tr>
<tr>
<td>D Minor Hero</td>
<td>[D, F, A]</td>
</tr>
<tr>
<td>E Minor Hero</td>
<td>[E, G, B]</td>
</tr>
<tr>
<td>F Major Hero</td>
<td>[F, A, C]</td>
</tr>
<tr>
<td>G Major Hero</td>
<td>[G, B, D]</td>
</tr>
<tr>
<td>A Minor Hero</td>
<td>[A, C, E]</td>
</tr>
<tr>
<td>B Diminished Hero</td>
<td>[B, D, F]</td>
</tr>
<tr>
<td>The Lord of all Chords</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>

**Playtest Session II**

In the second playtest session, each member received the updated game rules, one advanced chord chart and a basic chord chart. As the same as the first playtest, the team were required to give comments related but not limited to their expertise and designated roles.

During the second playtest, tests on [Set 7] clearly showed that the game was significantly improved from the “game” aspect. Having one Lord of All Chords card in the entire deck, prototype II resulted in the fact that only one player knew and most of the player did not know who had the Lord of All Chords card until it was used made the players interact with the game even more than before. Players had to be aware of the number of cards left in the drawing deck, the numbers and type of cards in the discard pile, and also the others’ chords. This deck of cards almost achieved the goals from both the “game” and “theory” aspects. Therefore, [set 7] was adopted in the final product.
Adding a new rule; shh!

Although including the Lord of All Chords card improved the game significantly, this card itself seemed to be too powerful; a player could use only this one card and simply win the game without spelling any other chords. The researcher considered that an extra rule should be created to counter this card. Therefore, the shh! rule was created as following paragraphs.

Any player can cancel (or shh!) any action in the game by discarding three of a kind at any time in the game; all cards associated with that action go to the discard pile.

Any players can shh! the Lord of all Chords.

Any players can shh! the drawing.

Any players can shh! the double power.

Any players can also shh! the shh!

Adding new terminologies in the game rules; new chord and old chord

Associated with the rule, “shh!”; the team discovered that it was a bit confusing to decide which card(s) should go to the discard pile if a chord receives shh! in the game. The game should include a further explanation in the game rules, therefore explanations of some terms were add as the follows:

- **New chord**: A chord that is newly spelled within a turn

- **Old chord**: A chord that has been used to do either an enharmonic attack or a chord from any previous turn

These terminologies with the following new extra explanations could help players to decide which cards should remain as a chord and which card(s) should go to the discard pile.
- If the shh!-ed chord is a new chord, all the cards associated with that chord go to the discard pile.
- If the shh!-ed chord is an old chord that has its value changed, shh! will only affect all accidental card(s) newly added and the chord returns to its previous value.

**Updating the condition to win the game**

It seemed like the condition of winning the game was quite complicated, and also players tended to focus on the Enharmonic Attack rule by keep writing the identical or enharmonically equals chords rather than keep writing different chord(s) to win the game. Therefore, the game simplified the conditions to the following version.

1. The first player who spell 5 or more chords (simply) wins the game. OR
2. When the draw pile is empty, the game ends immediately. The player who has the most spelled cards (including all of the taken cards from the enharmonic attack rule) wins the game.

**Questions about the game rules that may require further explanations**

While the team was testing prototype II, there were several questions mainly about the game rules asked by the players. For instance, can a player keep adding more accidental cards to a chord, in order to keep changing its value and get the maximum benefit of the Enharmonic Attack rule? Or, can a player change the value of a chord into an entirely new chord? These questions were noted and were be used as the advices to develop Prototype III.

Overall, the second playtest was a successful session, the game did show the potential to be a well-balanced game and covers the critical points from both the “theory” and “game” aspects. Moreover, the team spent most of the time to spot errors in the game, which were noted to improve the overall product.
Prototype III

Prototype III was mainly aimed to improve the core principal of the game even further. One of the focus point was answering the question “how should the game be designed to ensure that it does not alienate children or general audiences who were assumed that they do not have any kind of the knowledge background about chord writing and structure.” For this consideration, the Junior Deck was created (as seen in Table 12). To play Junior Deck, a player can simply remove all accidental cards from the game and change the card deck to become the combination as seen in Table 4/12. For future reference, this project refers to the card combination of this set as [Junior Deck], and [Set 7] is now called [Hero Deck].

Table 13

<table>
<thead>
<tr>
<th>The Cards</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>3</td>
</tr>
<tr>
<td>D</td>
<td>3</td>
</tr>
<tr>
<td>E</td>
<td>3</td>
</tr>
<tr>
<td>F</td>
<td>3</td>
</tr>
<tr>
<td>G</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>3</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
</tr>
<tr>
<td>C Major Hero [C, E, G]</td>
<td>3</td>
</tr>
<tr>
<td>D Minor Hero [D, F, A]</td>
<td>3</td>
</tr>
<tr>
<td>E Minor Hero [E, G, B]</td>
<td>3</td>
</tr>
<tr>
<td>F Major Hero [F, A, C]</td>
<td>3</td>
</tr>
<tr>
<td>G Major Hero [G, B, D]</td>
<td>3</td>
</tr>
</tbody>
</table>
A Minor Hero [A, C, E] 3
B Diminished Hero [B, D, F] 3
The Lord of all Chords 1
Total 43

Table 4.12 Junior Deck

The Junior Deck was aimed to welcome younger players or general audiences to play the game without any complications of the process of changing a chord value. However, the variety of the chords in the game is decreased significantly, as the notes are all in natural form when playing this deck. The Junior Deck will be tested in the third playtest session.

**Excluding the Advance Chord Chart**

From the standpoint of packaging design for mass production, the advanced chord chart was excluded, while the basic chord chart was redesigned with the same dimensions as the cards in the game. Every player can use this card with the basic chord chart (Figure 5) as a reference when playing the game. The advanced chord chart, presumably, will be placed online for players to download after the game has been officially released.

![Basic Chord Chart](image)

*Figure 6. Basic Chord Chart of Prototype III*
Game rules of Prototype III

After receiving comments and questions from the playtest session II, and with the inclusion of the Junior Deck and an attempt to give all the possible/reasonable explanations about the game rules, the updated game rules includes much extra information and was given to the playtest team for playtest session III.

General Rule

1) When the game starts, shuffle the card deck and deal 5 cards to each player.

2) Pick a player to go first and play clockwise or counter clockwise. The winner of the previous game can choose either to play first or last in the game.

3) At the beginning of each turn, draw 3 cards. At the end of each turn discard one card (of a player’s choice).

Each player has a limit of 8 cards in hands. At the end of each turn, if a player has more than 8 cards in his/her hands, discard all the cards (of a player’s choice) that exceed the 8 cards limit.

Players can use all the cards in his/her hands to spell chord(s), without discarding any card at the end of the turn.

4) With the cards, a player can spell as many chords as he/she likes and announce the end of his/her turn.

5) The player must name the chord correctly when spelling

6) A player can spell chords only during the player’s turn.

7) A player can use the accidental cards to change the value of a chord at any time in a player’s turn.

Enharmonic Attack Rule

When a player spells a chord that is same as or enharmonically equal to any prior spelled chords, all of those prior spelled cards (of that chord) now belong to the player who last spells the identical or enharmonically equal chord.
All of the taken cards belong under the chord that uses the enharmonic attack; put those taken cards facedown underneath the chord.

All the cards (including taken cards) that get an enharmonic attack belong to the recent player who spelled the chord using the enharmonic attack.

The taken cards are no longer considered as a chord.

A player can keep changing the value of a same chord within a turn, to get the maximum benefit.

A player can change the value of note(s) to an entirely new chord.

**Double Power Rule**

A player can discard 2 cards of any type to get a card from the discard pile during a player’s turn.

**Shh! Rule**

Any player can cancel (or shh!) any action in the game by discarding three of a kind at any time in the game. All cards associated to that action go to the discard pile.

Any player can shh! an action of a chord spelling or changing a chord’s value.

- If the shh!-ed chord is a new chord, all the cards associated with that chord go to the discard pile.

- If the shh!-ed chord is an old chord that has its value changed, shh! will only affect all accidental card(s) newly added and the chord returns to its previous value.

Any player can shh! the Lord of All Chords, the drawing, the double power and even the shh! Terminology:

- New chord: A chord that is newly spelled within a turn
- *Old chord:* A chord that has been used to do either an enharmonic attack or a chord from any previous turn

**Chord Police Rule**

*Any player in the game can be a chord police.*

*If a player names a spelled chord wrong; that chord belongs to the first player who corrects it.*

*If a player misspelled a chord (invalid chord/triad); those cards from the misspelled chord belong to the first player who corrects it.*

**Act of Kindness Rule**

*A player can use a Hero Card to request an exchange with other players during a player’s turn. Upon negotiation, any type and amount of cards can be exchanged between two players.*

**Conditions to Win the Game**

1. *The first player who spells 5 or more chords (simply) wins the game.* OR

2. *When the draw pile is empty, the game ends immediately. The player who has the most spelled cards (including all of the taken cards from the enharmonic attack rule) wins the game.*

**Playtest Session III**

The final playtest session was aimed to test the Junior Deck and spot any more error(s) in the game.

After testing the Junior Deck, the Lord of All Chord seemed to be overly powerful here even with the inclusion of the shh! rule. For this reason, the Lord of All Chord card was removed from the Junior Deck. Therefore, the total number of cards in the junior deck is 42 instead of 43.
The number of players allowed to play the Junior Deck also had to be lowered to 2-3 players, instead of 2-4 players. This was because excluding all the accidental and the Lord of All Chords cards (21 in total) caused the game end rather quickly for 4 players. By lowering the number of players in the game for the Junior Deck, this particular problem was solved.

Discussion on the two circumstances that will not be included in the final game rule

Two circumstances might occur in the game, but need not be included and explained in the game rules. However, for better understanding of the game rules, those circumstances should be discussed here.

1. The last player who empties the deck will draw 3 cards for the Junior Deck and 2 cards for the Hero Deck. This is supposed to help the player who plays last in the game to have a chance to turn the tide at the end of the game.

2. The player who start the game first will have more chance to win the game by writing 5 or more chords first, and the player who start the game last will have more chance to use the Enharmonic Attack rules and win the game by having the most cards.

Comments on the design of the product

Because most of the errors in the game were spotted and fixed during the first two playtest sessions, the majority of the comments here were about how to improve the final product, such as: 1) the game rules should include picture(s) of what the game looks like to help audience understand the game better; 2) the chord chart should include a small explanation of the double-sharp symbol (X = ##); and 3) the conditions to win the game should be placed on top in order to be easily seen, etc. These comments were noted and used to design the final prototype, which will be discussed in the next chapter.
Discussion on the Process of the Playtest Sessions

The main challenge of this project was how to design the product to serve the musical aspect properly and how to create a way to use it properly. Determining how many cards (and which types) should be in the game’s deck, and how many cards should be drawn in each turn, also took more time than expected.

When all the players in the playtest team understood the game rules, the playtime in each round decreased significantly (from approximately 45 minutes to only 10 minutes); however, this project would not increase the total number of cards in the final product just to increase the playing time, assuming the majority of the audience need some time to understand the game mechanism. If the game features too many cards, the audience may feel overwhelmed to play. If there is demand from the audience to increase the total number of cards, it is possible to do such in future edition(s). Some characters in the game also had been cut; however, with some modification, those characters may be used in future expansion(s).
CHAPTER V

THE FINAL PROTOTYPE OF A CARD GAME FOR LEARNING AND PRACTICING CHORDS

Final Prototype

After the playtest sessions, the game has become well-balanced and also provides a good amount of chord theory for players to learn and practice using this product. Most of the errors had been fixed during the playtests. Therefore, the game should run smoothly; however, when the game releases to the general audience, players may discover some errors that the playtest team have not noticed.

The final prototype (as seen in Appendix D) of the game is consisted of card decks (67 in total: 21 Natural Note cards, 20 Accidentals cards, 21 Chord Hero cards, 1 Special card, and 4 Basic Chord Chart cards), tokens and game rule sheets.

Implication of the Prototype

This game would be a great tool to attract music students to learn chords and can also be a perfect way to promote music to the general audience.

This prototype is now ready for the production process, and will be named "Chord Heroes." The game rules in the box are in English, but players can check the game rules in Thai on the Dr. Zax Games's Facebook page; Dr. Zax Games is a brand under College of Music, Mahidol University responsible for creating and advertising educational games. All of the characters and the game's logo are already filed for trademarks. The petty patent for the design of the cards is registered with the Thai Department of Intellectual Property, Ministry of Commerce.
Recommendations for Future Projects

The project will keep and document all feedback for future research in order to develop the second edition in the future. Future research may also study the impact of the game when it releases, and also how musicians use the game to learn chord structures, practice music theory, or even as a method of teaching.

If the game has been well-received by many audiences and has the chance to publish its expansion(s), these expansion(s) should be based on the same concept in order to support the fans and expand the core concept even further, for instance, an expansion that adds extra cards to allow players to spell seventh chords, or add extra cards for 5 to 8 players. Furthermore, a great amount of content, with regard to chord theory, has been adapted into the core mechanism of the game. The chords in the game are only limited to triads with the variations of major, minor, augmented, and diminished. The game may feature more chord theory content in future expansion(s).

Also, due to the limited resource for this project, the prototype only include the written game rules that provides specific detail of how to play the game properly. It would be ideal to include pictures of how to use cards in order to do a various actions in the game. For the best demonstration of how to play the game, it would be even better that the game have a video posting on the Internet (social media, YouTube, et cetera) for anyone who interested in the game and can see the actual flow of the game. Also, the game should have an official webpage for updating the rules after the game releases. This is because some players may find some interesting aspects of the game and create extra special rules in the future.

As for the playtest sessions, the game was tested in a limited amount of time and group of people. For better results in the future game, the game should have more time and more playtesters to test the game, especially when the game is based heavily (and had been
dealt in depth) on the music theory aspect as this game. Also, it is interesting to see the board games enthusiasts who do not have any musical background react to the game, and document how much he/she has learned about music after playing the game.

**Conclusion**

Board games are starting to become popular in Thailand, and had been applied to the education systems as alternative teaching methods. This clearly shows that board game might be the trend for the coming years. This creative work project aims to create a card game that would help the players learn and practice musical chords. It is hoped that the prototype developed by this project would help music students and as well promote music to general audiences.
Reference

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APPENDIX A

HANDOUT FOR THE PLAYTEST SESSION I

Playtest I Handout

Name of product
Chord Heroes

Type of product
Card game of a deck of X cards with play rules and instructions.

1. Basic concept

1) Use cards to spell the chords. Player first reaches the number of X chords, wins the game. There are other rules in the game to create a competitive learning environment.

2) Total number of cards is X (to be defined in playtests).

3) The game is for 2 to 4 players, from 10 years old and up

4) In each match, number of cards used is subject to number of players.

5) It contains natural note cards, accidental cards, chord hero cards.

6) This game requires basic knowledge of chord structures, including major, minor, augmented, and diminished chords. For beginners, playing with or instructing by at least one person who knows basic music theory is recommended.

2. General game rules

7) When game starts, shuffle the card deck and deal X cards to each player.

8) Pick a player to go first and play it clockwise or counter clockwise.

9) At the beginning of each turn, draw X cards.

10) With the cards, player can spell as many chords as he/she likes and announce the end of his/her turn.

11) The player must name the chord correctly when spelling

12) Player spell chords only in his/her turns.
13) The first one who spell X chords wins the game. Or, if the draw pile is empty, player who has the most chords wins.

3. **Rule of Enharmonic Attack**

   When a player spells a chord that is same as or enharmonic with any prior spelled chords, all those prior spelled chords belong to the player who last spells the identical or enharmonic chord.

4. **Rule of Chord Police**

   1. Any player in the game can be a Chord Police. If a player names or spells a chord wrong, other players can correct it. That wrong chord belongs to the one who first corrected it.

   2. If the misspelled chord is an invalid chord/triad; those cards from the invalid chord become the Chord Police’s hand cards.

5. **Rule of Act of Kindness**

   Player can use a Hero Card to request an exchange with another player. Upon negotiation, any types and amount of cards can be exchanged between two players.

6. **Types of card**

   1) **Natural Note Card**: Each card represents a natural note (white key on keyboard instruments)

   2) **Accidental Card**: In the player’s turn, these card can be used to change the value of the Natural Note Cards, or to add on a chord spelled from his/her prior turn.

   3) **Chord Hero Card**: This type of card consists more than one note in a card. Each card has its own character. Up to 2 Chord Hero Cards can be used to spell one chord.

      **Act of Kindness**: Player can use a Hero Card to request an exchange with another player. Upon negotiation, any types and amount of cards can be exchanged between two players.
APPENDIX B

HANDOUT FOR THE PLAYTEST SESSION II

Playtest II Handout

Name of product

Chord Heroes

Type of product

Card game of a deck of 63 cards, 4 basic chord charts (for each player), and game rules/instructions.

Basic concept

7) Use cards to spell chords in a competitive card game.

8) The game is for 2 to 4 players, from 10 years old and up

General rules

14) When the game starts, shuffle the card deck and deal 5 cards to each player.

15) Pick a player to go first and play clockwise or counter clockwise. The winner of the previous game can choose either to play first or last in the game.

16) At the beginning of each turn, draw 3 cards. At the end of each turn discard one card (of a player’s choice).

Each player has a limit of 8 cards in hands. At the end of each turn, if a player has more than 8 cards in his/her hands, discard all the cards (of a player’s choice) that exceed the 8 cards limit.

Players can use all the cards in his/her hands to spell chord(s), without discarding any card at the end of the turn.

17) With the cards, a player can spell as many chords as he/she likes and announce the end of his/her turn.

18) The player must name the chord correctly when spelling.

19) A player can spell chords only during the player’s turn.
A player can use the accidental cards to change the value of a chord at any time in a player’s turn.

**Final Round**

The final round occurs when a player spells 5 or more chords, the rest of the players have one more turn to play.

The game ends immediately when the draw pile is empty.

**To Win the Game:** The player who has the most spelled cards (including all of the taken cards from enharmonic attack rule) wins the game.

**Enharmonic Attack**

When a player spells a chord that is same as or enharmonic with any prior spelled chords, all of those prior spelled cards (of that chord) now belong to the player who last spells the identical or enharmonic chord.

All of the taken cards belong under the chord that uses the enharmonic attack; put those taken cards facedown underneath the chord.

All the cards (including taken cards) that get enharmonic attacked belong to the recent player who spelled the chord using the enharmonic attack.

The taken cards are no longer considered as a chord.

**Double Power**

A player can discard 2 cards of any type to get a card from the discard pile during a player’s turn.

**Chord Police**

Any players in the game can be a chord police.

If a player names a spelled chord wrong; that chord belongs to the first player who corrects it.

If a player misspelled a chord (invalid chord/triad); those cards from the misspelled chord belong to the first player who corrects it.
Act of Kindness

A player can use a Hero Card to request an exchange with other players during a player’s turn. Upon negotiation, any type and amount of cards can be exchanged between two players.

Types of cards

4) **Natural Note Card:** Each card represents a natural note. This card can be used with combination of another natural note cards and/or chord hero card(s) to spell a chord.

5) **Accidental Card:** At any time in a player’s turn, this card can be used to change the value of a chord. The card can be added to any spelled chords from a player’s prior turn.

6) **Chord Hero Card:** This type of card consists of more than one note in a card. Each card has its own character. Up to 2 notes on the card can be used to spell a chord.

   Example: C Major Hero (use E and G notes) + B Natural Card = E minor chord.

   F Major Hero + F Major Hero = a F major chord.

7) **The Lord of All Chords:** This card is a special card and can be declared and used as any chord without adding any notes or accidentals. The declared chord is final, no additional accidental cards can be added. This card can be removed from the game, if preferred.

Total number of cards is 63

- Natural Note Cards: 7 x 3 sets = 21
- Accidentals Cards: 4 (sharp, flat, double sharp, double flat) x 5 sets = 20
- Chord Hero Cards: 7 types x 3 sets = 21
- The Lord of All Chords = 1
APPENDIX C

HANDOUT FOR THE PLAYTEST SESSION III

Playtest III Handout

Name of product
Chord Heroes

Type of product
Card game of a deck of 63 cards, 4 basic chord charts (for each player), and game rules/instructions.

Basic concept

9) Use cards to spell chords in a competitive card game.

10) The game is for 2 to 4 players, from 10 years old and up.

Types of cards

8) Natural Note Card: Each card represents a natural note. This card can be used with any combination of any other natural note card(s) and/or chord hero card(s) to spell a chord.

9) Accidental Card: At any time in a player’s turn, this card can be used to change the value of a chord. The card can be added to any spelled chords from a player’s prior turn.

10) Chord Hero Card: This type of card consists of more than one note in a card. Each card has its own character. Up to 2 notes on the card can be used to spell a chord.

Example: C Major Hero (use E and G notes) + B Natural Card = an E minor chord.

F Major Hero + F Major Hero = an F major chord.

11) The Lord of All Chords: This card is a special card and can be declared and used as any chord without adding any notes or accidentals. The declared chord is final, no additional accidental cards can be added. This card can be removed from the game, if preferred.
Junior Deck, for beginners.

Natural Note Cards: 7 x 3 sets = 21

Chord Hero Cards: 7 types x 3 sets = 21

The Lord of All Chords = 1

Total number of cards is 43

Hero Deck, for advanced players.

Natural Note Cards: 7 x 3 sets = 21

Accidentals Cards: 4 (sharp, flat, double sharp, double flat) x 5 sets = 20

Chord Hero Cards: 7 types x 3 sets = 21

The Lord of All Chords = 1

Total number of cards is 63

General rules

21) When the game starts, shuffle the card deck and deal 5 cards to each player.

22) Pick a player to go first and play clockwise or counter clockwise. The winner of the previous game can choose either to play first or last in the game.

23) At the beginning of each turn, draw 3 cards. At the end of each turn discard one card (of a player’s choice).

Each player has a limit of 8 cards in hands. At the end of each turn, if a player has more than 8 cards in his/her hands, discard all the cards (of a player’s choice) that exceed the 8 cards limit.

Players can use all the cards in his/her hands to spell chord(s), without discarding any card at the end of the turn.

24) With the cards, a player can spell as many chords as he/she likes and announce the end of his/her turn.

25) The player must name the chord correctly when spelling.

26) A player can spell chords only during the player’s turn.
27) A player can use the accidental cards to change the value of a chord at any time in a player’s turn.

**Enharmonic Attack**

When a player spells a chord that is same as or enharmonically equal to any prior spelled chords, all of those prior spelled cards (of that chord) now belong to the player who last spells the identical or enharmonically equal chord.

All of the taken cards belong under the chord that uses the enharmonic attack; put those taken cards facedown underneath the chord.

All the cards (including taken cards) that get an enharmonic attack belong to the recent player who spelled the chord using the enharmonic attack.

The taken cards are no longer considered as a chord.

A player can keep changing the value of a same chord within a turn, to get the maximum benefit.

A player can change the value of note(s) to an entirely new chord.

**Double Power**

A player can discard 2 cards of any type to get a card from the discard pile during a player’s turn.

**Shh!**

Any player can cancel (or shh!) any action in the game by discarding three of a kind at any time in the game. All cards associated to that action go to the discard pile.

Any player can shh! an action of a chord spelling or changing a chord’s value.

- If the shh!-ed chord is a new chord, all the cards associated to that chord go to the discard pile.

- If the shh!-ed chord is an old chord that has been changing its value, shh! will affect only all accidental card(s) that have been added and the chord returns to its previous value.
Terminology:
New chord: a chord that is newly spelled within a turn.
Old chord: a chord that has been used to do either an enharmonic attack or a chord from a previous turn.

Any players can shh! the Lord of all Chords.

Any players can shh! the drawing.

Any players can shh! the double power.

Any players can also shh! the shh!

Chord Police

Any player in the game can be a chord police.

If a player names a spelled chord wrong; that chord belongs to the first player who corrects it.

If a player misspelled a chord (invalid chord/triad); those cards from the misspelled chord belong to the first player who corrects it.

Act of Kindness

A player can use a Hero Card to request an exchange with other players during a player’s turn. Upon negotiation, any type and amount of cards can be exchanged between two players.

To Win the Game

1. The first player who spells 5 or more chords wins the game.

The game ends immediately when the draw pile is empty, the player who has the most spelled cards (including all of the taken cards from enharmonic attack rule) wins the game.
APPENDIX D

FINAL PROTOTYPE OF THE CARD GAME

Natural Note Cards
Accidentals Cards

- Sharp (#)
- Double Sharp (##)
- Flat (b)
- Double Flat (bb)
Chord Hero Chards

**A Minor Hero**
“She is always jealous of something.”
- A hero card.
- Can use her as a note card.
- Can use up to 2 notes.

**B Diminished Hero**
“He is weird.”
- A hero card.
- Can use him as a note card.
- Can use up to 2 notes.

**C Major Hero**
“She is harmless.”
- A hero card.
- Can use her as a note card.
- Can use up to 2 notes.

**D Minor Hero**
“He loves drama.”
- A hero card.
- Can use him as a note card.
- Can use up to 2 notes.
E Minor Hero
“He is so tiny.”
★ A hero card.
★ Can use him as a note card.
★ Can use up to 2 notes.

F Major Hero
“It cannot speak.”
★ A hero card.
★ Can use him (?) as a note card.
★ Can use up to 2 notes.

G Major Hero
“They always act like big brothers/sisters.”
★ A hero card.
★ Can use them as a note card.
★ Can use up to 2 notes.
Special Card – the Lord of All Chords

The Lord of All Chords
"Actually, he is really annoying."

- The card is not declared, no special effect.
- The declared chord is final, no extra accidental cards can be added.

Basic Chord Chart

<table>
<thead>
<tr>
<th>Major</th>
<th>Minor</th>
<th>Augmented</th>
<th>Diminished</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-E-G</td>
<td>C-E♭-G</td>
<td>C-E-G#</td>
<td>C-E♭-Gb</td>
</tr>
<tr>
<td>D-F-A</td>
<td>D-F-A</td>
<td>D-F-A#</td>
<td>D-F-A♭</td>
</tr>
<tr>
<td>E-G♭-B</td>
<td>E-G♭-B</td>
<td>E-G♭-B♭</td>
<td>E-G♭-B♭</td>
</tr>
<tr>
<td>G-B-D</td>
<td>G-B-D</td>
<td>G-B-D♭</td>
<td>G-B-D♭</td>
</tr>
<tr>
<td>A-C♯-E</td>
<td>A-C♯-E</td>
<td>A-C♯-E♭</td>
<td>A-C♯-E♭</td>
</tr>
<tr>
<td>B-D♯-F#</td>
<td>B-D♯-F#</td>
<td>B-D♯-F♯</td>
<td>B-D♯-F♯</td>
</tr>
</tbody>
</table>

X = ##
The Card Back of Cards
Design of the Package (Box)
หนังสือแสดงเจตนาให้เผยแพร่ผลงานในคลังสารสนเทศสถาบันของมหาวิทยาลัยมหิดล
Mahidol University’s Institutional Repository (Mahidol IR)
(http://repository.it.mahidol.ac.th)

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ตัวแทนส묵ศและหลักฐานรูปมหาวิทยาลัยมหิดล จึงดำเนินการรวบรวมผลงานวิชาการของบุคคลที่
มหาวิทยาลัยมทตเพื่อนำไปเผยแพร่เอกสารฉบับเต็ม (Full text) ในรูปแบบสื่อตระกูลในคลังสารสนเทศสถาบัน
ของมหาวิทยาลัยมหิดล (Mahidol IR) เพื่อเป็นประโยชน์ต่อสาธารณชนในการศึกษา ค้นคว้า วิจัย

โดยหนังสือฉบับนี้ ขอแจ้งว่า ผ่านทางนักงานสารสนเทศ นางวณิชย์ นิชิภุทธนิค ได้ยื่นสื่อตระกูลในการเลือก
ที่เผยแพร่ (Full text) ของงานวิจัยของคุณ

☑ อินเทอร์เน็ต (Full text) ในรูปแบบสื่อตระกูล

☐ บทความวารสาร  ☐ ห้องปฏิบัติงาน  ☐ งานวิเคราะห์  ☐ งานกล่าวความ  ☐ ทรัพยากรสิ่งที่มีกิจ
☐ หนังสือ/คำรา  ☐ อื่นๆ [โปรดระบุ Creative Work
1. A Prototype of a Credit Game for Recognizing Orchestral Musical Instruments
2. Prototype of a Credit Game for Learning and Practicing Chords
3. 
4. 

☐ ไม่ยืนยัน เนื่องจาก

(ลงชื่อ) นางวณิชย์ นิชิภุทธนิค

(วัชรินทร์ แซ่สมบูรณ์)

แบบหนังสือแสดงเจตนาให้เผยแพร่ โดยมีสำนักงานวิจัยของมหาวิทยาลัย มีชัยศักดิ์ชักวิรุฬห์ ห้องสมุดและคลังฐานวิจัยมหาวิทยาลัยมหิดล
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