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Escape Beneath: An Original Game Score Inspired by an Analysis of Garry Schyman's Music

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ESCAPE BENEATH: AN ORIGINAL GAME SCORE INSPIRED BY AN ANALYSIS OF GARRY SCHYMAN'S MUSIC

By

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ABSTRACT

Video-game music has grown into a vast array of different styles, sounds, and applications. As a newer field of music, game scoring has begun to receive high acclaim. Garry Schyman has become one of the most successful composers within the video-game industry. His music has received many awards and nominations throughout the years. Despite this, research and analysis into his compositions and techniques are almost non-existent. This thesis studies his techniques within the video-game scores for *BioShock*, *BioShock 2*, *BioShock Infinite*, *Middle Earth Shadow of War*, and *Torn*; and then applies them into an original score for an upcoming video game called *Escape Beneath* from Dread Vector Studios.

ACKNOWLEDGEMENTS

My wife Emily and my daughter Luna, my parents Gary and Ainslie Cooper, my sister Ashley Cooper, my in-laws Brian and Janet Lavell, Mr. Garry Schyman, Dr. Stephen Lias, Dr. Samantha Inman, Vincent Diamante, Dr. Inga Meier, Mason Lieberman, Dr. Dina Alexander, Dr. Daniel Barta, Dr. Timothy Shannon, Dr. Paul Shewan, Mike Van Allen, Christopher Jones, Dr. Russell Scarbrough, Corry Roggerson and the rest of the Dread Vector Studios team, Nathan Stenberg, Joseph Finazzo, Sen Neitz, Brenton Riling, Kara and Paco Reyes, and Nili Brosh.

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CHAPTER 1 – INTRODUCTION

Musical scores within video games have developed significantly since their original electronic sounds. Game music has gone from the simple "beep" and "boop" sounds of chiptunes to high-resolution orchestral and synthesized recordings with six-figure budgets for live musicians, realistic virtual sounds, recording and production, marketing, and more. During this evolution, the fundamentals of orchestration, harmony, and melody have become more important than ever as video-game scores have become more elaborate than the initial chiptune music. As with the composers of any genre or period, many video-game composers have distinguished their work through highly individual sounds and textures that define a personal signature style. Few exemplify this better than Garry Schyman (b. 1954), an American composer who has achieved much acclaim in video-game scores, film scores, and concert works. Not only does he utilize the harmonic and melodic language from Classical and Romantic periods, but he also uses contemporary techniques (such as aleatoric music) to create vivid soundscapes and emotions for the narrative of a game.[1] This thesis analyzes both the compositional aspects of Garry Schyman's game scores and their contextual application within the game play.

1. Emily Reese. "*BioShock* Composer Garry Schyman on Top Score," Classical MPR, last modified May 24, 2011, https://www.classicalmpr.org/story/2011/05/23/top-score-episode-4-garry-schyman-bioshock.

As a relatively new field, video-game composition has generated only the very beginnings of a body of research. More specifically, scholarly research into Garry Schyman's music is almost nonexistent, despite his stature as a composer of significance within the video-game industry from scoring twenty video games from major studios, winning numerous awards including a British Academy of Film and Television Arts (BAFTA) award and Game Audio Network Guild awards, and being a faculty member of University of Southern California Thornton School of Music's screen scoring program.[2] Of around 150,000 theses and dissertations that mention video-game music within their documents as of 2021, none currently focus on Schyman's music.[3] This thesis provides new research into his music through analysis, followed by application of his techniques within an original score that I have composed for a video game. To best understand how the compositions of Schyman's function within a game, I have provided synopses of the video games as well as a basic glossary of applicable video-game language. The original score is comprised of cues that represent different game states and locations within the virtual environment.

2. Garry Schyman, "Awards," Garry Schyman, March 19, 2021, https://garryschyman.com/awards/.

3. "Video Game Music," ProQuest Dissertations and Theses Global, accessed October 4, 2022, https://www.proquest.com/pqdtglobal/results/61D00E46CCCD422FPQ/1?accountid=6444.

The compositions within this thesis are for an upcoming game called *Escape Beneath* by Dread Vector Studios. With teammates in the United States and Europe, Dread Vector Studies is a small, independent game company that is currently in its startup phase. I worked with the Dread Vector Studios team to determine the needs for the original score while also being able to compose using techniques I observed through my analysis of Garry Schyman's cues. This include his approach to instrumentation and orchestration, diatonic harmony and chromaticism, and aleatoric techniques. The music is implemented into the game through the game's main programming engine. Although the score's implementation into the game is not a core focus of this thesis; I will discuss elements of its implementation when appropriate to aid understanding of how the music functions and adapts within the game. Video excerpts are also referenced to show how the music interacts within corresponding game states.

I. Analytical Methods

In additional to general Roman numeral analysis, I use set theory and Neo-Riemannian theory to analyze the cues. The use of set theory reveals different relationships in the consonances and dissonances within the cues. Pitch-class sets and interval vectors quantify these relationships. A primary source that I utilized for set theory is *Understanding Post-Tonal Music* by Miguel A. Roig-Francoli. He describes the use of interval vectors as a way to assess the interval combinations present within a pitch-

class set.[4] These interval vectors reveal the different interval combinations and their quantities within the pitch-class sets.

I use Neo-Riemannian theory to explore some of the different transformations in sonorities within *Escape Beneath's* "Exploratory Theme" cue. I determined that this cue would be composed from Neo-Riemannian theory standpoint. Since Dread Vector Studios and I decided that the exploration music should be somewhat subtle but interesting, the triadic transformation potential that Neo-Riemannian theory provides was ideal for *Escape Beneath*. I consulted Daniel Christopher Obluda's dissertation "Topics in Hollywood Scores: Using Topic Theory to Expand on Recent Neo-Riemannian Analyses of Film Music" to review the different transformation methods within Neo-Riemannian theory.[5] Frank Lehman's essay "Transformational Analysis and the Representation of Genius in Film Music" and book *Hollywood Harmony* were also utilized to reinforce my understanding of the different transformation types.[6]

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4. Miguel A. Roig-Francoli, *Understanding Post-Tonal Music*, 2nd ed. (New York, NY: Routledge, 2008), 86-89.

5. Daniel Christopher Obluda, "Topics in Hollywood Scores: Using Topic Theory to Expand on Recent Neo-Riemannian Analyses of Film Music," PhD diss., (University of Colorado at Boulder, 2021), ProQuest Dissertations & Theses Global.

6. Frank Lehman, *Hollywood Harmony Musical Wonder and the Sound of Cinema* (New York, NY: Oxford University Press, 2018); Frank Lehman, "Transformational Analysis and the Representation of Genius in Film Music," *Music Theory Spectrum* 35, no. 1 (2013): pp. 1-22, https://doi.org/10.1525/mts.2013.35.1.1.

II. Chapters

This thesis is separated into three main chapters after this introduction. Chapter 2 analyzes different cues that Garry Schyman composed for video games. The analyses within this chapter utilize Roman numeral analysis, set theory, orchestration techniques, and contextual applications to the games. Chapter 3 discusses my original cues for *Escape Beneath*. This chapter still uses Roman numeral analysis and set theory, but it also incorporates Neo-Riemannian theory. When applicable, I also discuss some of the requests and developments that happened with the cues and Dread Vector Studios during the composing and implementation processes. Chapter 4 contains the full scores of the *Escape Beneath* cues.

III. Appendices

Appendix A provides a synopsis for each of the researched games that Schyman scored and for *Escape Beneath*. Although knowing the synopsis of each game is not required for understanding the musical analysis, it can be beneficial. I mention characters, settings, and plot points during the analysis when important. Appendix B contains a glossary of video-game terminology.

CHAPTER 2 – AN ANALYSIS OF GARRY SCHYMAN'S MUSIC

In this chapter, I provide an analysis of Garry Schyman's music. These cues are taken from the games *BioShock*, *BioShock 2*, *BioShock Infinite*, *Torn*, and *Middle Earth: Shadow of War*. Throughout my analysis, set theory is the predominant analytical method; however, other points of analysis include Roman numeral analysis, aleatoric techniques, and orchestration. These points of analysis were utilized during the composing process of the music for *Escape Beneath*.

I. Chromaticism Layered into Diatonicism

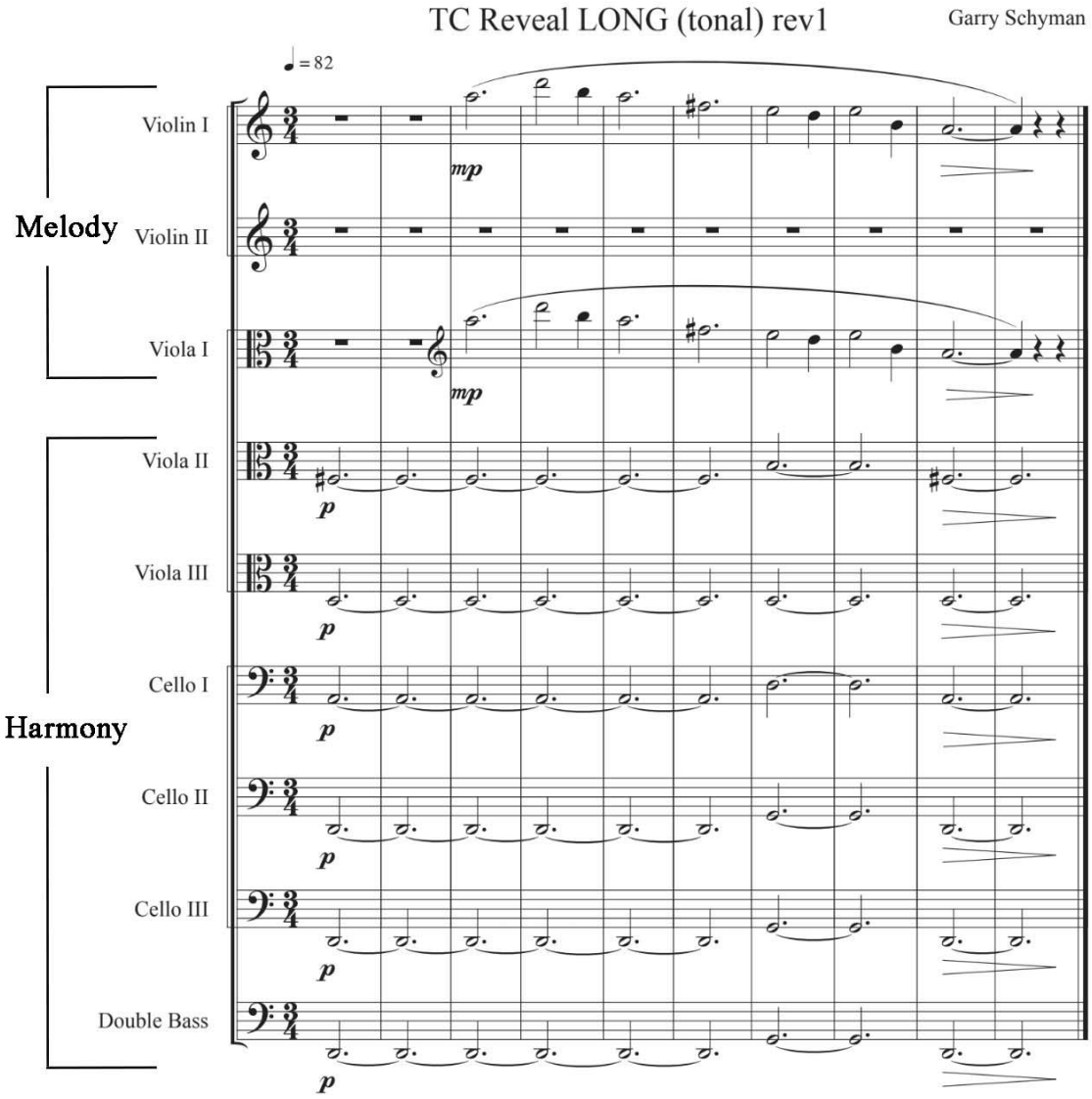
BioShock Infinite, composed by Garry Schyman and released by Take-Two Interactive Software, has moments of chromaticism layered into diatonic music which creates harmonic and emotional tension.[7] The harmonic stability of the diatonic section is disrupted by the chromatic layers, creating friction and uneasiness. When *BioShock Infinite's* playable character Booker first sees Columbia (a flying city in the sky and the game's main setting), the seemingly peaceful cue "TC Reveal LONG" plays. The instrumentation within the diatonic cue (primary cue) is a live-recorded, nine-piece string ensemble (2, 3, 3, 1) playing a slow, simple melody inspired by Americana music;

7. Garry Schyman, composer, *BioShock Infinite* Soundtrack, Take-Two Interactive Software, 2013, MP3.

specifically, the hymn "Will the Circle Be Unbroken," which is also featured throughout the game.[8] Performing in their higher registers, violin one and viola one share the melody; which contrasts to viola two and three, the cellos, and the bass, which are playing in their lower registers. The first violin and first viola float over the low, open-voiced chords providing space between the melody and chords (ex. 1). Also, a small number of instruments are playing in divisi, which heightens a sense of fragility.

8. "*BioShock Infinite*: Scoring in the Sky, a Postmortem." Presented by Garry Schyman (GDC Vault. Recorded March 2015, Accessed January 10, 2021), https://www.gdcvault.com/play/1021835/BioShock-Infinite-Scoring-in-the.

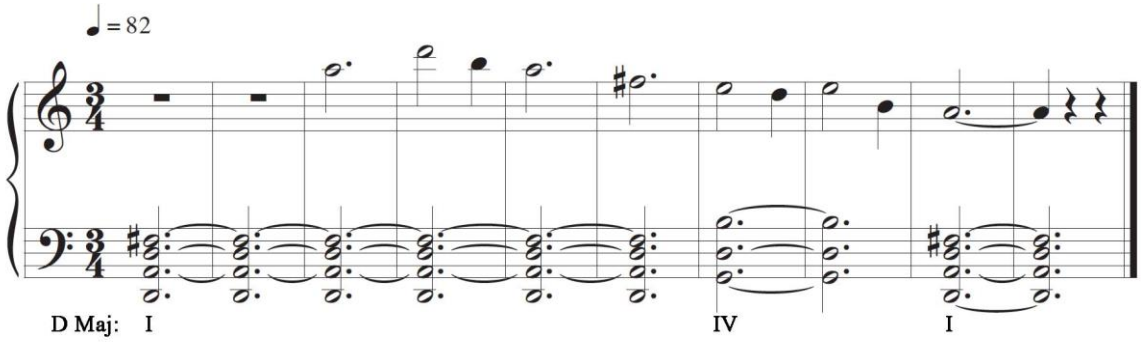
Example 1 – "TC Reveal Long" Score[9]



9. Ibid, 0:18:05 to 0:18:37. This score was presented on-screen at this talk, but it has been transcribed and reduced for clarity.

The harmonic progression in this section follows a steady I-IV-I progression in D major (ex. 2).

Example 2 – Harmonic Progression of Tonal "TC Reveal Long"

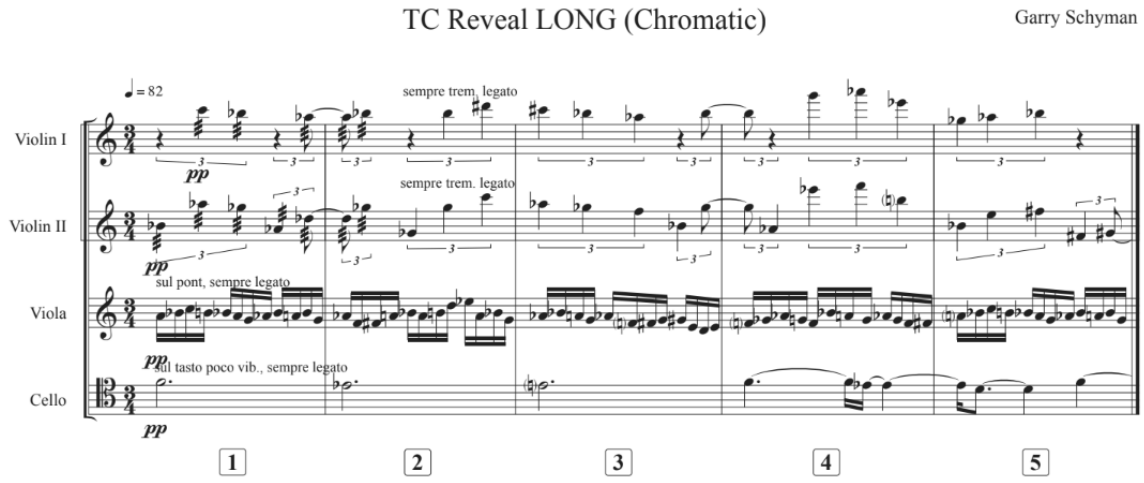


The slow-moving harmonic structure emphasizes the seemingly calm environment that Columbia presents. Moving from the tonic chord to the subdominant and back also provides stability to cue. Although no leading tones or other tensions exist within this part of the cue, there is a second section of the cue that hints at the underlying darkness of Columbia.

Slowly fading in and out of the primary cue is a secondary cue. As this secondary cue fades in and out, the instrumentation and ranges ensure that all parts can be heard in the background while the diatonic portion remains in the foreground. The instrumentation remains almost the same, a change is two violas instead of three, but the ranges change in most of the instruments and chromaticism is present instead of diatonic harmony. In the diatonic portion of the cue, the cellos and violas were in their low register while the

violin was in its mid-range; however, in the chromatic portion of the cue, all of the instruments have ascended to higher ranges (ex. 3).

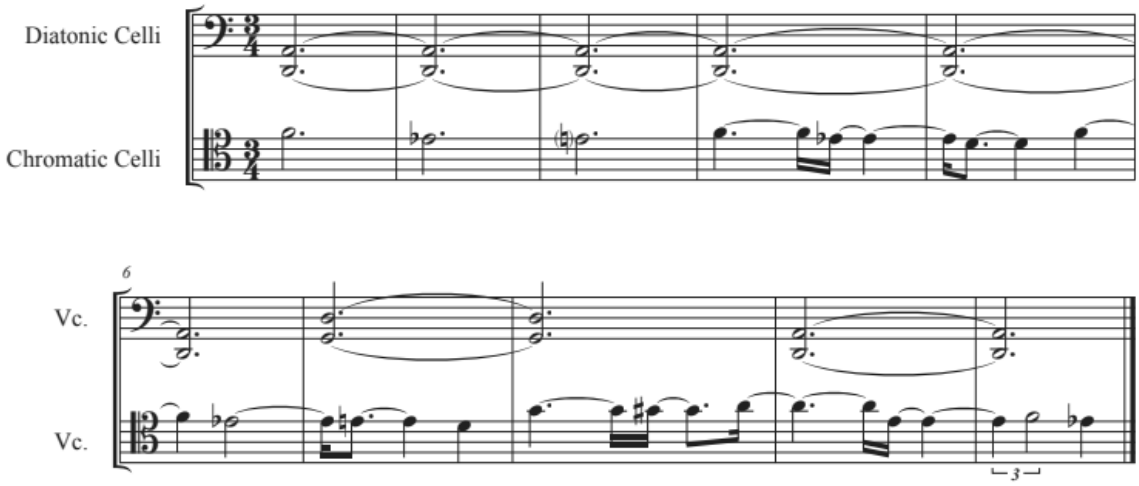
Example 3 – Reduced "TC Reveal Long (Chromatic)"[10]



The second layer's chromaticism moves against the diatonic notes in the primary/diatonic cue. The cellos in the primary cue begin with open fifths of the D major chord in the low register while in the secondary cue, the cellos are in unison in the upper range and descend upon the root following F, Eb, E, F, Eb, D. The harmonic rhythm is faster than the primary cue as well (ex. 4).

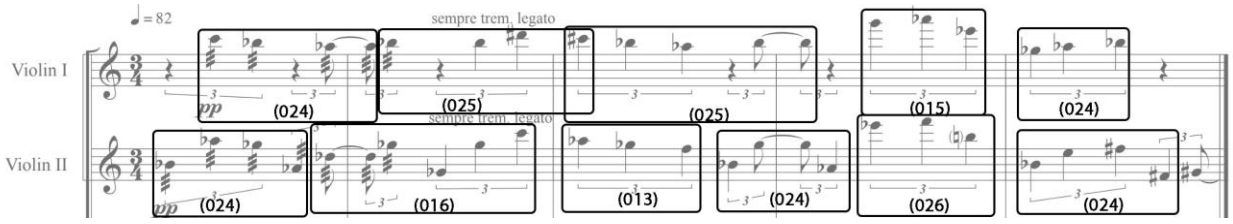
10. *BioShock Infinite*: Scoring in the Sky, a Postmortem." Presented by Garry Schyman, 0:18:39 to 0:19:00. (GDC Vault. Recorded March 2015, Accessed January 10, 2021). https://www.gdcvault.com/play/1021835/BioShock-Infinite-Scoring-in-the. This score was presented on-screen at this talk, but it has been transcribed and reduced for clarity.

Example 4 – Cello Reduction of Chromatic and Diatonic Parts



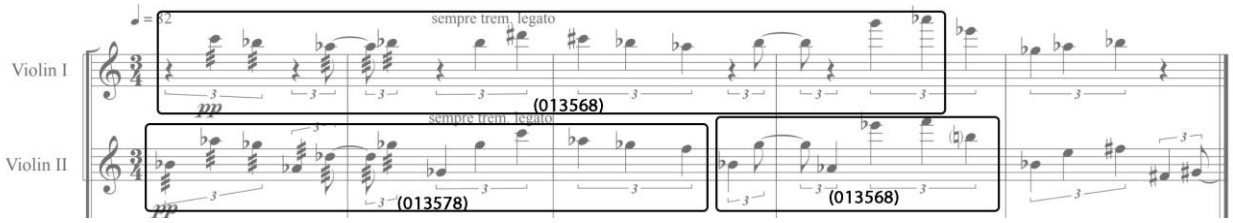
When analyzing the chromatic section of the cue, pitch-class sets and interval vectors can be used to determine the relationships between the pitches, possible outcomes of consonances and dissonances, and what patterns and sequences exist within the intervals. Within this cue, the violins' sets yielded the most interesting results when broken down into trichords. Violin I's chromatic passages reveal sets of (024), (025), and (015). Violin II's chromatic passages use similar sets of (024), (016), (013), and (026). Although the violins are using chromaticism with wide leaps between consecutive notes, the pitch sets in their prime forms are similar. Both violins use the (024) sets multiple times but with different combinations of notes (violin I with the notes C, Bb, Ab and Gb, Ab, Bb; violin II with the notes Bb, Ab, Gb and E, F#, G#) (ex. 5).

Example 5 – Trichord Pitch-Class Sets



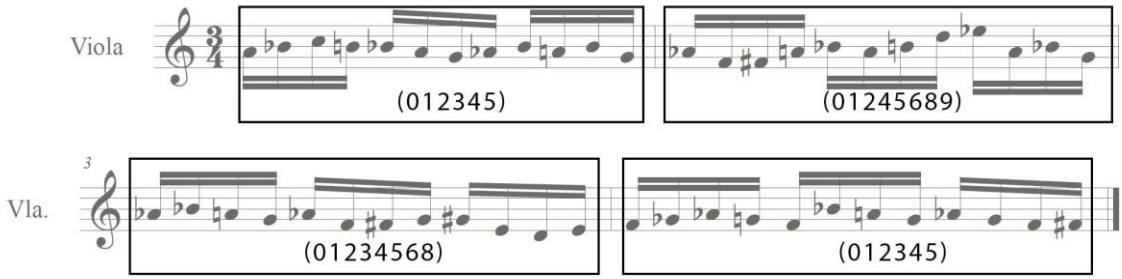
When the sets are extended, there is also a shared hexachord between the two. Violin I has a (013568) hexachord. Violin II has two hexachords in this passage, one (013578) hexachord and one (013568) hexachord like in the first violin (ex. 6).

Example 6 – Violin Pitch-Class Sets Comparison



When analyzed as trichords like the violins, the violas' chromatic passages rely heavily on (012), (013), and (014) pitch-class sets. Although other sets do appear as well, (025) and (026), the core sets are the (012), (013), and (014) trichord sets (ex. 7). Since the overall pattern of the violas in a repeating four-bar phrase, each measure could also be analyzed as a full set itself. Measures 1 and 4 both form a (012345) hexachord and measure two and three are octachords of (01245689) and (01234568).

Example 7 – Viola Pitch-Class Sets

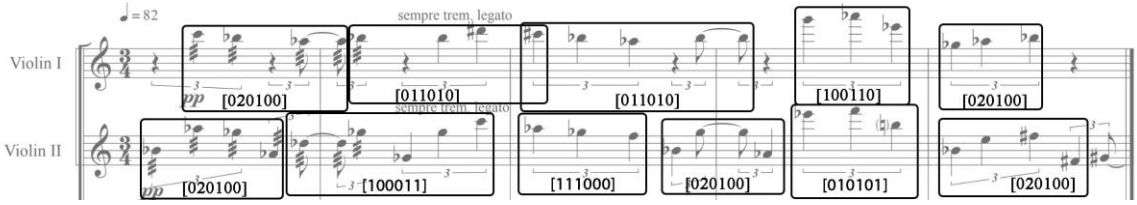


Lastly, the cellos have similar dissonant sets to the violins and violas. Measures 1-3 form a (012) trichord set, and mm. 4-5 form a (013) trichord set. The rate of attack between the three instrument groups varies from fast to slow. Although all three groups have various surface rhythms, they all are making use of dissonant sets. The violas serve as the common denominator for the sets as well. A (013) set is found across all three groups, (012) is found in the cellos and the violas, and (026) is found in both the violas and the violins. It is interesting to note that out of twelve possible trichord sets, this chromatic passage utilizes the first eight trichord sets of (012), (013), (014), (015), (016), (024), (025), and (026). This shows that smaller intervals movement is prioritized over larger intervals movement within the phrases.

With the pitch-class sets discovered in the violins and violas, these chromatic passages heavily emphasize dissonances as revealed by the interval vectors. Since possible minor second and tritone combinations are revealed by the out numbers of an interval vector, we can use these interval vectors to discern the consonances (inner numbers) and dissonances (outer numbers) within the pitch-class sets. Violin I's trichord

sets of (024), (025), and (015) have interval vectors of [020100], [011010], and [100110], while violin II's trichords sets of (024), (016), (013), and (026) have interval vectors [020100], [100011], [111000], and [010101]. Violin I's interval vectors reveal some dissonances with major and minor seconds being preset; but violin II's interval vectors display more dissonances than the first violins due to the presence of more seconds and tritones. The hexachord pitch-class sets also show a collection of dissonances. The shared (013568) hexachord has an interval vector of [233241] and the (013578) hexachord has an interval vector of [233241]. Although the more consonant intervals outnumber the dissonant intervals, the interval vectors still reveal a strong presence of dissonances within the first and second violins. Both hexachords and the first nonachord have five possible combinations of minor second dissonances while the second nonachord has six possible minor second dissonances.

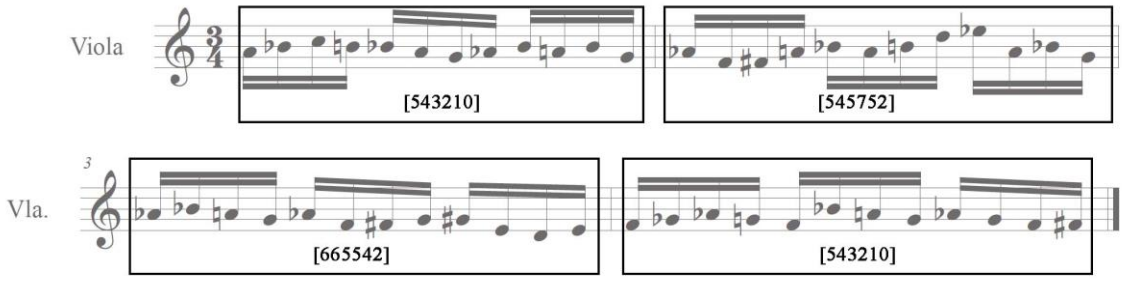
Example 8 – "Chromatic Reveal" Violins Trichord Interval Vectors



The interval vectors in the violas reveal more dissonances than the violins. As stated, the trichord sets within violas' chromatic passages are (012), (013), (014), (025), and (026); and they contain interval vectors of [210000], [111000], [101100], [011010], and [010101]. These interval vectors show that there is an emphasis on dissonances through the seconds and tritones. The whole-measure sets also indicate an increased

emphasis on dissonances. The (012345) hexachord and (01245689) and (01234568) octachords have respective interval vectors of [543210], [545752], and [665542]. The (012345) hexachord and the first octachord have five possible combinations of minor second dissonances while the second nonachord has six possible minor second dissonances. Both octachords also have two possible combinations of tritone dissonances.

Example 9 – "Chromatic Reveal" Violas Trichord Interval Vectors



One other find within the secondary cue is the lack of the leading tone. Every pitch except C#/Db is found within the chromatic cue. The primary cue also lacks the leading tone. Without the leading tone, the most standard resolution to the tonic is missing from the cue. This can add to the dissonance of the cue since there is not a leading resolution present.

II. Compositional Techniques in Suspense and Combat

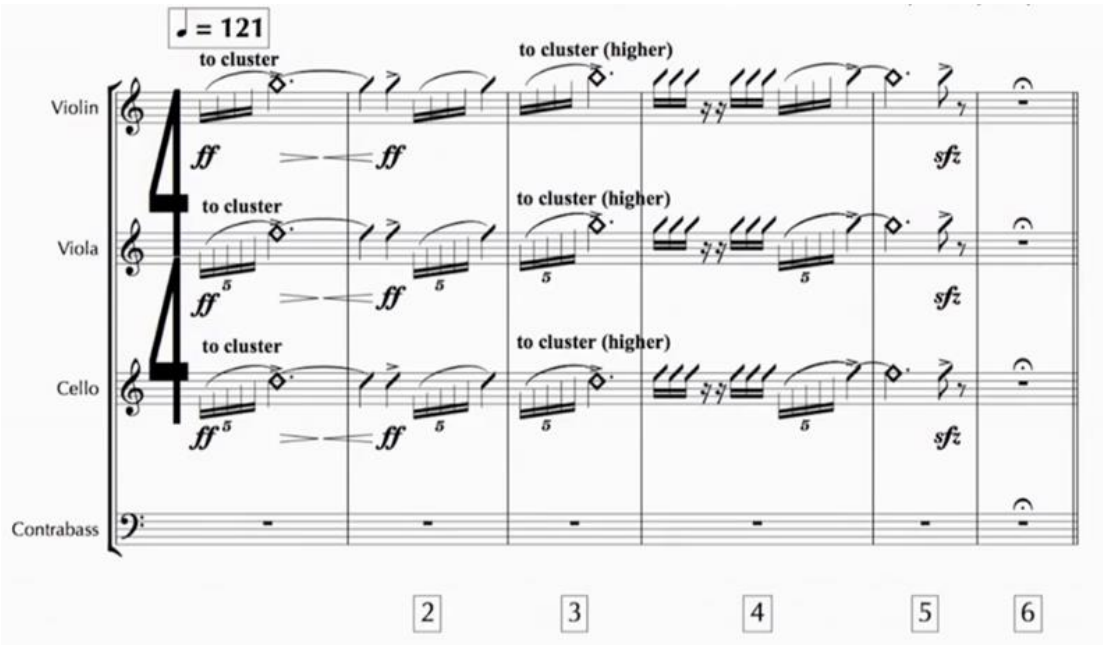
Combat gameplay in *BioShock Infinite* can be chaotic, fast-paced, and unrelenting. Many combat game states involve the player utilizing firearms, explosives, and powers (called vigors, which have the ability to set enemies on fire, freeze them,

throw them, and more) while facing large hordes of enemies with differentiating combative abilities (such as fighting a large group of soldiers consisting of some soldiers utilizing long-range weapons, some with short-range weapons, some having heavy defensive capabilities, and more). Adding to the stress of a large enemy group, combat can take place on the ground, in the air on top of airships, or on the rail lines that the player can attach to in order to better traverse the battlefield. During these moments of combat, *BioShock Infinite's* score creates tension and uneasiness by utilizing aleatoric techniques and expressive techniques (dynamics, articulation, and range) to exemplify the chaos within its combat states. Although *BioShock Infinite's* "Combat Aleatoric" cue is the primary example, this technique can also be found in the first two *BioShock* games.[11] The cue "Combat Aleatoric" consists of two, primary aleatoric groups: strings and percussion. Measures 1-6 are played when a threat is detected in the game. This threat may or may not be immediately visible to the player, so it indicates that combat is about to begin. The strings first begin with undefined cluster chords in the violin, viola, and cello. Schyman does indicate the general range of the chords and rhythms to be performed, but the clusters are up to the players and undetermined (noted by the "to cluster" marking in m. 1). Reflecting the anticipation of combat, the clusters ascend in

11. Emily Reese. "*BioShock* Composer Garry Schyman on Top Score," Classical MPR, last modified May 24, 2011, https://www.classicalmpr.org/story/2011/05/23/top-score-episode-4-garry-schyman-bioshock.

pitch. This is indicated to the players by the "to cluster (higher)" marking in m. 3 (ex. 10).

Example 10 – Aleatoric Clusters[12]



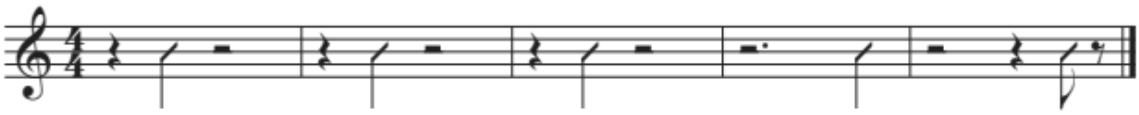
Expressive techniques also signal combat. Dynamics, articulations, and instrument range and timbre all add to the tension of the combat cue. The dynamics of mm. 1-5 are primarily *fortissimo*. A *decrescendo* in m. 1 is immediately followed by a *crescendo* into measure 2. None of these have a specific, softest dynamic to go down to, the only established dynamics are starting on *fortissimo* and ending the *crescendo* on

12. "*BioShock Infinite*: Scoring in the Sky, a Postmortem." Presented by Garry Schyman, 0:32:22 to 0:32:43. (GDC Vault. Recorded March 2015, Accessed January 10, 2021). https://www.gdcvault.com/play/1021835/BioShock-Infinite-Scoring-in-the.

fortissimo. The final dynamic in m. 5 is a *sforzando*, increasing the loudness of the section and clusters even more.

The only articulations in mm. 1-5 are accents. Each measure contains one accent that emphasizes beat two in mm. 1-3, but then emphasizes beat four in mm. 4-5 (ex. 11). These accents destabilize any sense of steady meter. Although the pulse may become unstable to the player, these accents build anticipation and heighten an emotional response to the impending challenge.

Example 11 – Reduction of Accented Beats in "Combat Aleatoric"



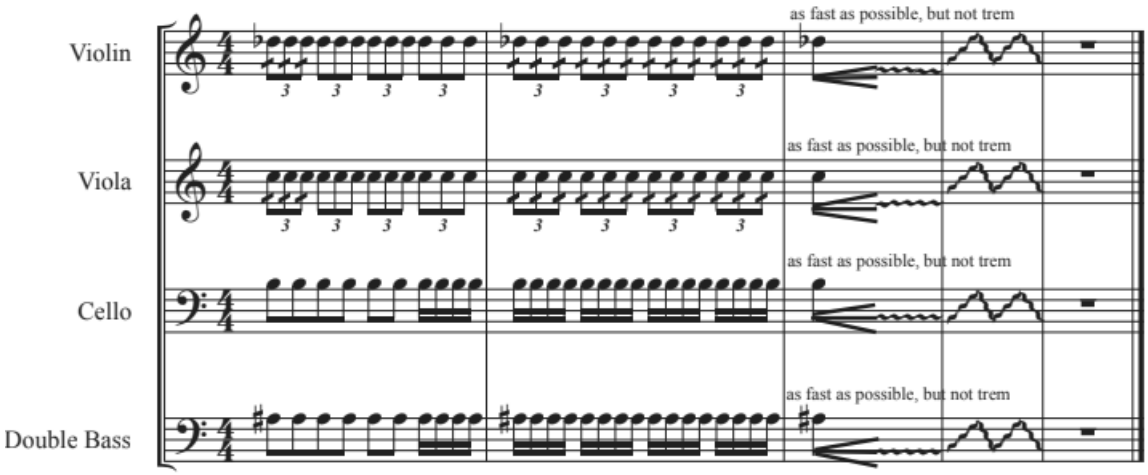
The ranges of the clusters are spread across the different timbre areas of the instruments. This combination of range and timbre creates a cluster grouping of notes that are close together (despite being different instruments) while adding a spectrum of timbres that work together to create the harsh sound. The violin is voiced in a range that is very comfortable but can have a "nasal" quality when performed on the high E string. The viola is in a higher range but not overly piercing. The cello is in its highest range, which is where it tends to have a piercing and agitated sound.

Two more techniques for that Schyman uses for combat cues appear in the *BioShock* and *Middle Earth* games: rhythmic ostinatos and aleatoric *glissandos* within the string sections. These techniques create an environment of excitement and nervousness for players during combat game states.

As shown in Example 11, the ostinato phrases extend for more than a measure and are not homogenous among the instruments. Although the downbeats are in sync among all of the instruments, the violins and violas are rhythmically grouped together with triplet-based patterns, while the cellos and basses are rhythmically grouped together with duple-based patterns of eighth notes and sixteenth notes. When combined, rhythmic displacement is apparent through the 3:2 and 3:4 polyrhythms. Although not rhythmically aleatoric, the displacement from the polyrhythms coupled with some instances of measured tremolos within the triplets does create a chaotic and aleatoric-like sound.

In some cues, the string musicians are given guides in the notation that indicate how they can play the *glissando* passages. "Combat Aleatoric" mm. 20-21 indicate "as fast as possible" with ascending and descending *glissando* markings. Where the players land in their *glissandos* in this section is irrelevant; the effect and agitation that is presented from the *glissandos* is what is important. During these *glissando* passages, tremolo bowing at *fortissimo* is also used to accentuate the effect (ex. 12).

Example 12 – Polyrhythms and *Glissando* in "Combat Aleatoric"[13]

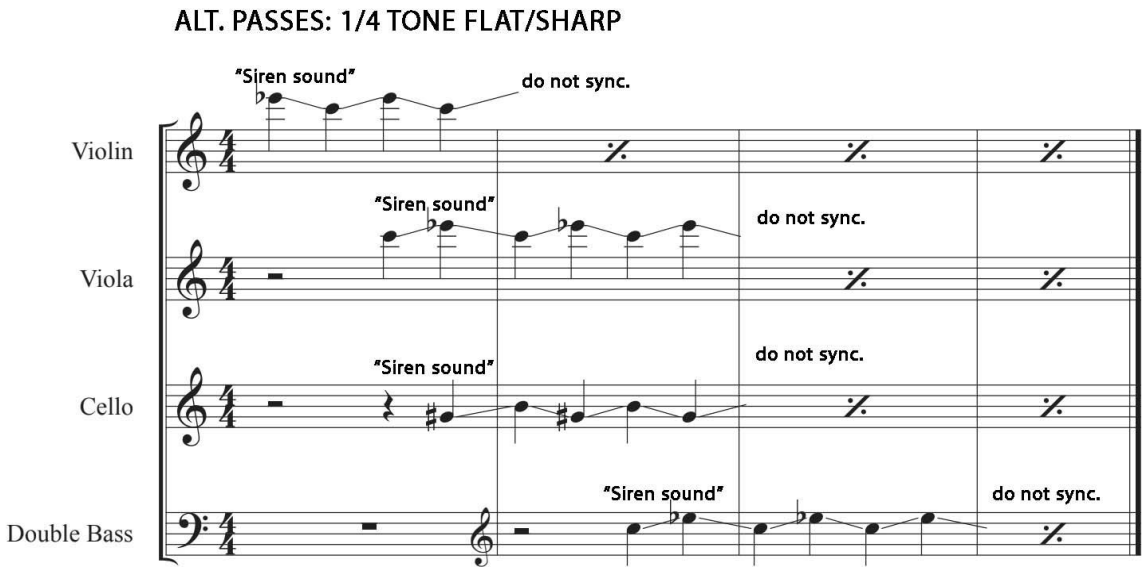


Although a technique like tremolo bowing on a *glissando* passage can add speed and tension to a combat game state, it is not the only way that Schyman creates suspense with the *glissandi*. Feelings of suspense and tension can be accentuated for the player due to the *glissandi* being noted to have a "siren sound." Marker G in "Combat Aleatoric" uses *glissandi* between minor third intervals. The minor third creates a dark sound for each instrument. To maintain the aleatoric feel, players are instructed to avoid syncing their *glissandi* playing while accelerating. This disrupts a stable rhythm that the quarter notes could potentially create. To add even more dissonance to this section, players are instructed to have alternate takes with the notes being a quarter-step sharp and a quarter-

13. "*BioShock Infinite*: Scoring in the Sky, a Postmortem." Presented by Garry Schyman, 0:33:40 to 0:35:27. (GDC Vault. Recorded March 2015, Accessed January 10, 2021). https://www.gdcvault.com/play/1021835/BioShock-Infinite-Scoring-in-the. This score was presented on-screen at this talk, but it has been transcribed for clarity.

step flat. *Scordatura* could be used for these additional passes of the phrase or the players could control this with their fingers. Although pitches are given for the *glissandos*, the *scordatura* destabilize the pitches themselves, creating a state of suspense and dread (ex. 13).

Example 13 – *Glissando* with *Scordatura* in "Combat Aleatoric"[14]



Percussion:

The percussion within "Combat Aleatoric" was created spontaneously. In his talk at 2015's Game Developers Conference (one of the largest, annual conferences for

14. "*BioShock Infinite*: Scoring in the Sky, a Postmortem." Presented by Garry Schyman, 0:36:06 to 0:36:25. (GDC Vault. Recorded March 2015, Accessed January 10, 2021). https://www.gdcvault.com/play/1021835/BioShock-Infinite-Scoring-in-the. This score was presented on-screen at this talk, but it has been transcribed for clarity.

professionals within the video-games industry), Garry Schyman describes his process for the percussion portion of the cue. He states that the percussion elements were not written out at all and were meant to be raw and ragged. Inspiration for the raggedness of the percussion came from listening to drum circles in Venice Beach, California.[15] Schyman played the percussion parts directly into his DAW as he saw fit. During this process, he stayed away from fully quantizing all of the percussion layers so that it is a more realistic and humanized performance. It was also to fit the aleatoric elements since it was all freely played and recorded by instinct.

III. Orchestration Styles within Suspense and Combat

Throughout his games, Schyman has mainly used large orchestrations during combat and a mix of large or small orchestrations for suspense cues.[16] He stresses that composing and orchestrations should still be reflective of the emotions and stories of the games.[17] The *Middle Earth* games are reflective of this. "The Arena" cue from *Middle*

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15. "*BioShock Infinite*: Scoring in the Sky, a Postmortem." Presented by Garry Schyman, 0:31:22 to 0:32:23. (GDC Vault. Recorded March 2015, Accessed January 10, 2021). https://www.gdcvault.com/play/1021835/BioShock-Infinite-Scoring-in-the.

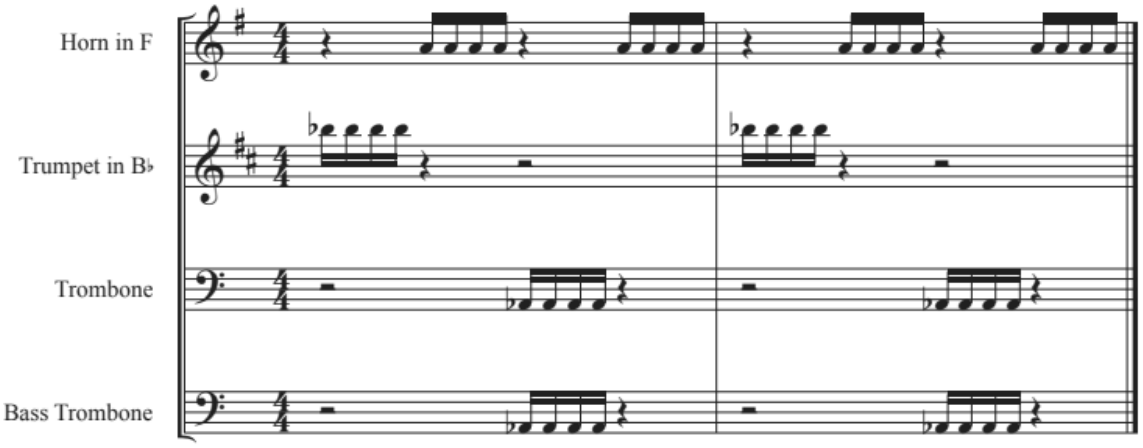
16. Ibid.

17. "Ep 11: How to Build Worlds with the Orchestra (Garry Schyman)" interview by Matt Kenyon, Composer Code. Last modified April 12, 2019. https://composercode.com/ep-11-how-to-build-worlds-orchestra/.

Earth: Shadow of War utilizes large orchestration.[18] This large orchestration correlates with the combat style of the game. Contrary to *BioShock Infinite's* combat style, combat gameplay within the *Middle-Earth: Shadow of War* is slower, more stylized (due to attack combinations that the player can perform), weightier, and less dependent on ranged attacks. Its orchestration complements this type of combat by being louder and more bombastic. The orchestration in *Middle-Earth: Shadow of War* is heaviest in the brass and percussion sections. The brass section shifts dramatically through the different ranges of instruments, and includes sections of dovetailing between trumpet, French horn, trombone, and bass trombone (ex. 14).

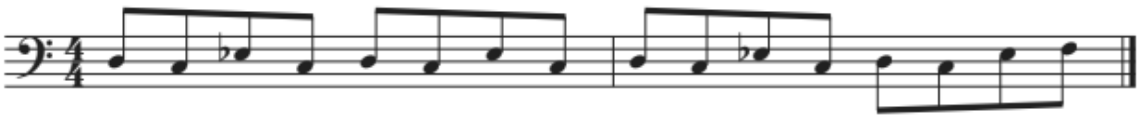
18. Garry Schyman and Nathan Grigg, "Middle-Earth: Shadow of War," November 12, 2017, soundtrack video, 0:24:39 to 0:26:12, https://youtu.be/cD0sQ2Dzj4Q.

Example 14 – Dovetailing in "The Arena"[19]



At the start of this cue, the low brass functions as the primary pulse by establishing the quarter-note rhythm. After it has been established, the low and mid-range brass sections establish an eighth-note pulse outlining C minor (ex. 15).

Example 15 – Eighth-Note Line in the Brass within "The Arena"[20]



Although the brass initially begins this motif in the piece, it is not exclusive to the brass family. Both the low and high string sections take over the eighth-note pulse from the brass section, but at the end of the cue the low strings continue it while the high

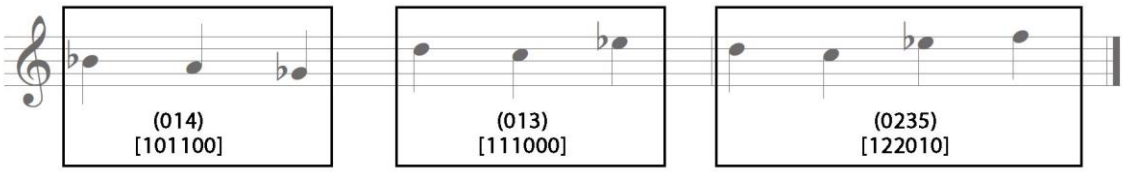
19. Transcribed by the author.

20. Transcribed by the author.

strings switch to aleatoric *glissandi* (reminiscent of *BioShock Infinite's* "Aleatoric Combat" cues).

Within the dove-tailing and the eighth-note motifs, familiar trichord sets emerge (ex. 16). The trichord in the dove-tail section is an (014) pitch-class set. The eighth-note pulse utilizes a repeating trichord and a tetrachord. The trichord is an (013) pitch-class set and the tetrachord is the (0235) pitch-class set. These trichords and tetrachord have interval vectors of [101100], [111000], and [122010], which continue to show Schyman's use of dissonances that favor seconds.

Example 16 – Pitch-Class Sets and Interval Vectors in "The Arena"



BioShock Infinite is one exception to the classic-large orchestral approach to combat and suspense cues.[21] Due to the game's dark, disturbing nature and sci-fi setting, the music utilizes many darker sounds. When composing some of the "Aleatoric Combat" cue, Schyman initially gravitated toward large orchestrations or at least a large number of players in a section. During this process, he discovered that by having more

21. Matt Helgeson "Game Music Spotlight: *BioShock Infinite* Composer Gary Schyman," Game Informer, published March 19, 2013, Accessed February 1, 2021, https://www.gameinformer.com/b/features/archive/2013/03/19/game-music-spotlight-bioshock-infinite-composer-gary-schyman.aspx.

players performing this cue, the music began to sound "correct."[22] The aleatoric and dissonant lines actually started to sound less rigid and more consonant. When the orchestration was thinned to one player on each part, the dissonance in the music because the most intense that it had sounded. A single player on each part made the music sound "annoying" and chaotic, as it was supposed to sound.[23] Although it is typical to use large orchestrations to create heavy and intense music, Schyman discovered that a small ensemble, instead of a large ensemble, was better at creating the intensity and chaos needed.

IV. Sparse Elements within a Peaceful Environment

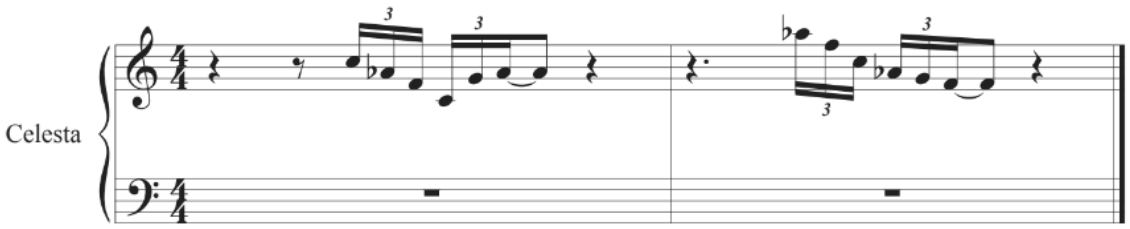
The music of *Torn* tends to be more spatial/less bombastic than many of the other games previously mentioned. Although *Torn* still contains action, the game is rooted more in puzzle solving and exploration. The exploration within *Torn* is immersive for the player since it is a virtual-reality game. With a fantasy-meets-science-fiction premise, the music of *Torn* contains a soft and whimsical sound. Across many of the cues, a celesta motif appears. Although the pitches may change throughout the different cues, its harmonic context and rhythm remains. The celesta motif is quick and ornamental in nature and rarely becomes a melody. Despite this, it is one of the defining sounds and

22. "*BioShock Infinite*: Scoring in the Sky, a Postmortem." Presented by Garry Schyman.

23. Ibid.

motives of the *Torn* sound track. The cue "Rena" is representative of the celesta motif (ex. 17).

Example 17 – Celesta in "Rena"[24]



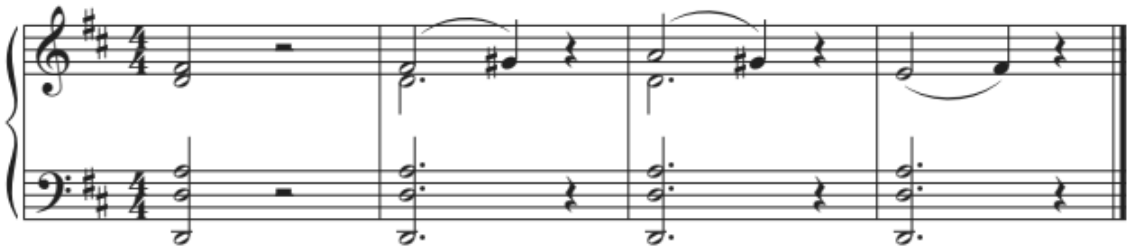
The consonance of the celesta part is clear in the pitch-class sets and interval vectors. The motif is built on an (0237) tetrachord. The interval vector of this tetrachord is [111120]. Although there are seconds and thirds within this interval vector, the most common (by a narrow margin) interval is the fourth. The fourths provide overall consonance and open space within this motif while still utilizing seconds and thirds to add direction and tension.

One other important element of the *Torn* soundtrack is its ability to breathe and establish space. Many game soundtracks are built on cues that constantly move, whereas *Torn* takes time to rest. For example, "End of the Tunnel." The cue begins with strings in D Lydian. This motif creates a spacious atmosphere through longer-duration notes and rests. Although the strings cease to play during the rests (and at times, none of the other

24. Transcribed by the author.

instruments play as well), the space created by the rests become a part of the motif (ex. 18).

Example 18 – String Reduction in the Opening of "End of the Tunnel"



V. Chapter Conclusion

These cues capture many of the nuances of his compositional style, and are only a small part of Schyman's catalog. Through the use of set theory, balances and imbalances of consonance and dissonance are revealed. It was interesting to find that even in larger pitch-class sets, the dissonances were still the most prominent intervals utilized. This prominence was not surprising in chromaticism; however, it was interesting to see their prominence in cues like "The Arena," which sound more consonant than just chromaticism. Schyman's use of aleatoric techniques in *BioShock Infinite's* "Combat Aleatoric" cue is fascinating. The scores do provide a guide for the players, but leaving *glissando* speed, pitch clusters, and percussion hits aleatoric help accentuate the chaos of the game. These techniques were all influential during the composing process of *Escape Beneath*.

CHAPTER 3 – ANALYSIS OF THE *ESCAPE BENEATH* COMPOSITIONS

My involvement in *Escape Beneath* began after working on three small projects with Dread Vector Studios. Although *Escape Beneath* began as a short game jam competition demo for the Dungeon Crawler VR Game Jam 2021, the team discovered that the project had tremendous potential to expand into a full-length game.[25] I have been working with the development team over the year and have produced eight cues of various lengths to match game states for exploration, scenery, and combat. While not all of my original music is a direct outgrowth of Schyman's techniques, much of it carries traces of things I learned through exploring his work.

I have chosen five of my cues to discuss in detail. In order to focus on the compositional elements that most clearly relate to Schyman's compositional practices, I will introduce each cue with a brief paragraph that summarizes the musical characteristics of the cue (key, meter, instrumentation, etc.). This provides a point of departure from which to proceed to the matters of Schyman's influence.

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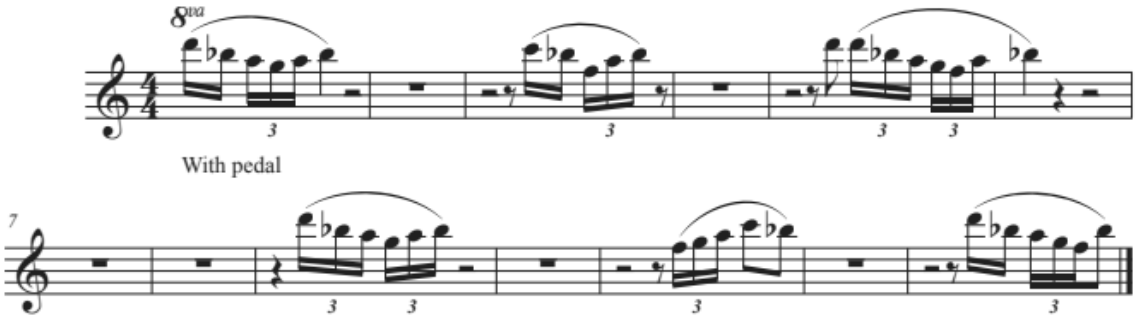
25. This game jam was a challenge to design, build, and demonstrate a virtual reality dungeon crawler video game in thirty days. https://itch.io/jam/dungeon-crawler-vr-game-jam-2021/rate/1299835.

I. Spatial Theme

Utilizing both space and dissonance, the "Village Theme" in *Escape Beneath* (full-score on pages 86-94) incorporates some of the elements that Schyman used in *BioShock Infinite's* "The Reveal"cue and *Torn's* "Rena" cue. The village within *Escape Beneath* is somewhat subdued and melancholy but has the presence of magic and mystical powers. Throughout the "Village Theme" cue (and to represent the mysticism of the town), a piano performs short flourishes of notes similar to the celesta in "Rena." Like Schyman's cues, the flourishes are diatonic and are in a higher register than most of the instruments (ex. 19).

Example 19 – Piano Note Flourishes in the "Village Theme"

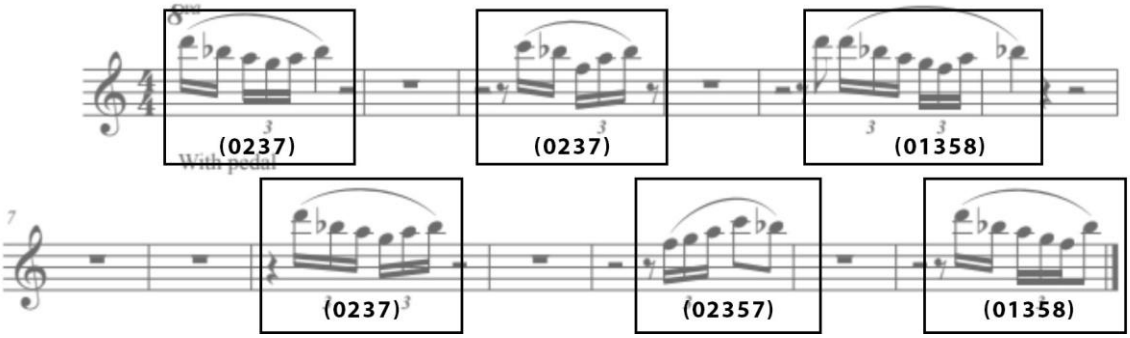


The flourishes are meant to be performed lightly, and the sustain pedal used allows the notes to sustain and decay naturally before the next flourish plays.

Although I wanted to compose these piano flourishes with a similar feel as the celeste in "Rena," I did not compose them with any pitch-class sets in mind. Despite this, measures 1, 3, and 9 are all (0237) tetrachords. Measure 11 extends the tetrachord into an

(02357) pentachord. Another tetrachord appears in mm. 5-6, (0135). This tetrachord also extends to a pentachord in m. 13 as an (01358) pentachord (ex. 20).

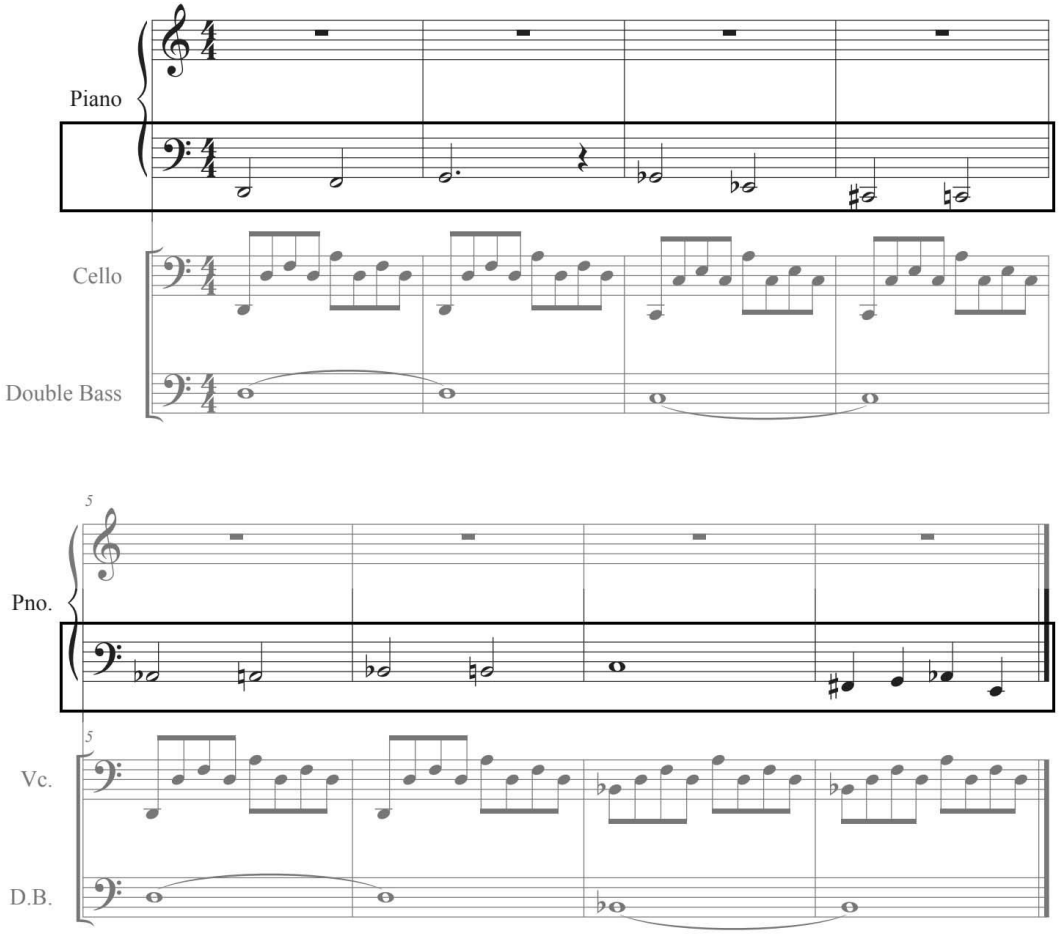
Example 20 – Pitch-Class Sets within the "Village Theme's" Flourishes



Although the interval vectors of the new tetrachord and pentachords reveal a combination of dissonances and consonances like Schyman's, I did not use the same pitch-class sets. The (01358) pentachord has an interval vector of [122230]. In this pentachord, only one minor second continues to appear while there are two instances of major seconds, minor thirds, and major thirds. The most common interval is now the perfect fourth. By extending the (0237) tetrachord to the (02357) pentachord, stability is now the dominating sound since it also has three instances of the perfect fourth. The (02357) pentachord has an interval vector of [132130]. Although this pentachord's interval vector has more major seconds than the (01358) pentachord (almost as if it swapped a major third for a major second), a common denominator between them is the inclusion of three, perfect fourths. These two pentachords add space and consonance to the motif due to these fourths.

One element within this cue is a layer that fades in and out periodically. A piano softly and slowly plays a chromatic passage within its C1-E2 range. Similar to how there is an underlying darkness in Columbia within *BioShock Infinite,* not all is as it seems in the village within *Escape Beneath*. Like in *BioShock Infinite's* "TC Reveal LONG" cue, this passage uses low chromaticism to create uneasiness and unrest while traversing the village. The passage stays in the background of the cue to maintain subtlety. It is not meant to be an immediate focus; it is meant to have a psychological effect. I chose the low register of the piano so that the notes hide behind the cellos and basses. I also mixed in chord tones are also used at times so that the chromatic notes appear more unexpectedly (ex. 21).

Example 21 – Chromatic Notes in the “Village Theme”

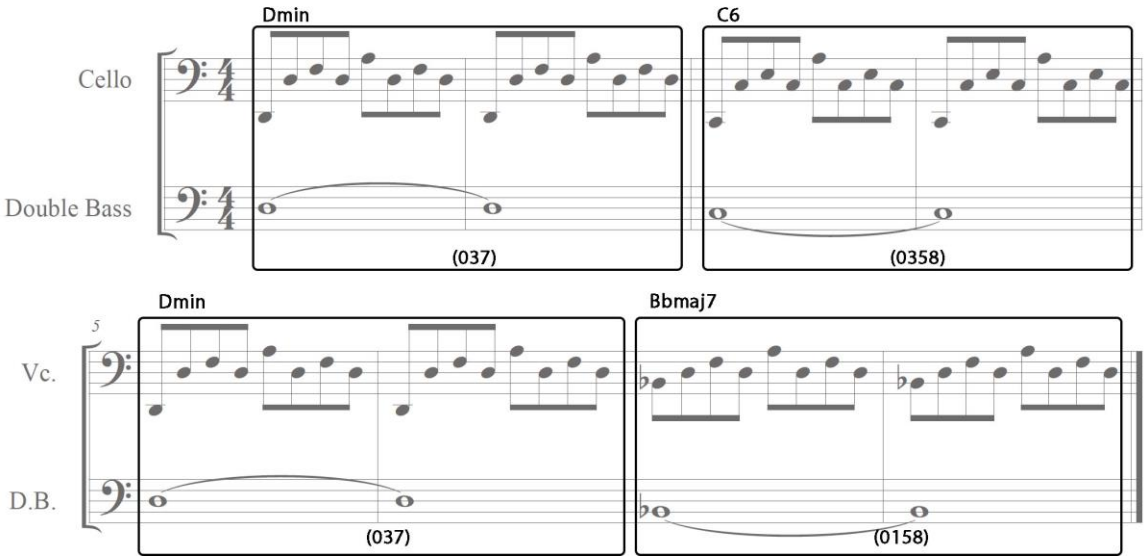


Their infrequency and subtlety allow for stability to resume and lure the player into a false sense of security. That is why the implementation of this layer is critical; it is not always present, but plays only periodically while the player is in the village.

The pitch-class sets of the diatonic section are (037), (0358), and (0158) in the cello and bass parts. Although they are different chords in mm 1-6, the D minor chords and C6 chord are the same when it comes to prime-form pitch-class sets (ex. 22). Measures 7-8 are a Bbmaj7 chord. The interval vectors of these chords are [001100],

[012120], and [101220]. All major seconds and tritones are avoided while the thirds and perfect fourths are most common. Since these are diatonic chords, their interval vectors further illustrate their stability.

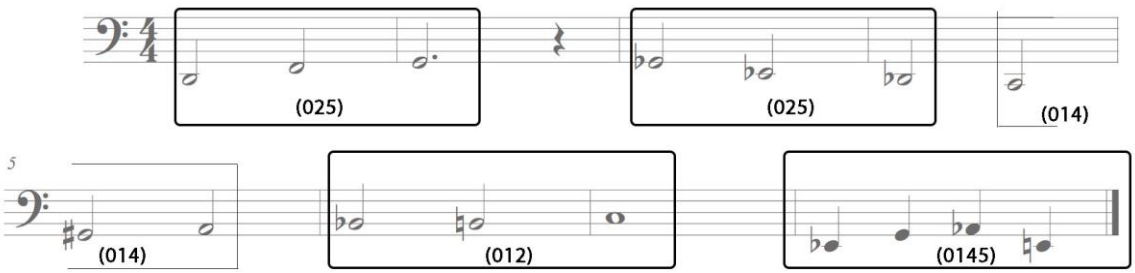
Example 22 – Pitch-Class Sets in the Diatonic Progression within the "Village Theme"



The chromatic notes reveal differences in their interval vectors when analyzed as trichords and hexachords. The trichord pitch-class sets of (025), (014), and (012) show a level of degrading stability. The (025) sets are the most stable sets of the trichords as seen in its interval vector of [011010]. It shows the presence of a major second, minor third, and perfect fourth; all stable intervals. The (014) is slightly less stable than the (025) with its interval vector of [101100]. Now only a minor second, minor third, and major third are present. The (012) is the least stable of the trichords with its interval vector of [210000]. The minor seconds are now the most common interval. An (0145) tetrachord is present in the last measure as well. The interval vector of this tetrachord is [221100] which still

relies mostly on seconds. Although the initial purpose of the chromatic notes playing against the diatonic chords was to create tension and dissonance, it is interesting to see that even the chromatic notes themselves degrade into more dissonance over time (ex. 23).

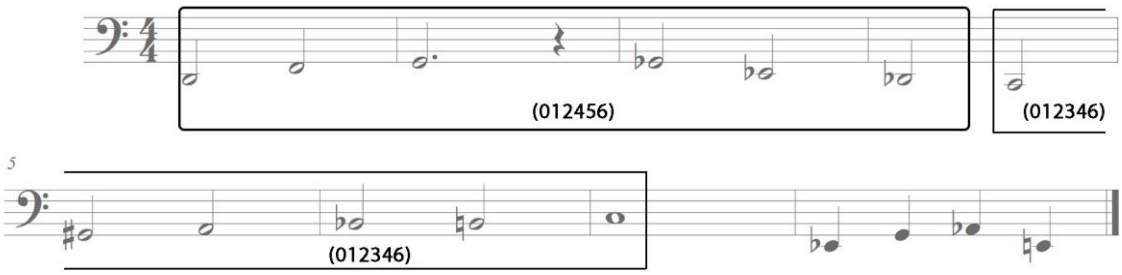
Example 23 – Degrading Trichord Pitch-Class Sets within the "Village Theme"



If the trichords are analyzed as hexachords instead, the dissonances are even more apparent. The two hexachords in this section are (012456) and (012346), with their interval vectors being [432321] and [443211] respectively (ex. 24). Both of these hexachords include a tritone for dissonance; however, the dissonances still mainly rely on seconds. There are four minor seconds within each hexachord. What is remarkable about this is that dissonant intervals are the most prominent intervals despite consonant intervals being the most common intervals within hexachord interval vectors (there are one hundred ninety-one 2nds, one hundred ninety-four 3rds, one hundred one perfect fourths, and forty-nine tritones). In total, the (012456) hexachord has eight dissonant intervals and seven consonant intervals, and the (012346) hexachord has nine dissonant intervals and six consonant intervals. By slowly adding more dissonance (or degrading

the consonance), this increase in dissonance is similar to the increase in dissonance that the trichords have.

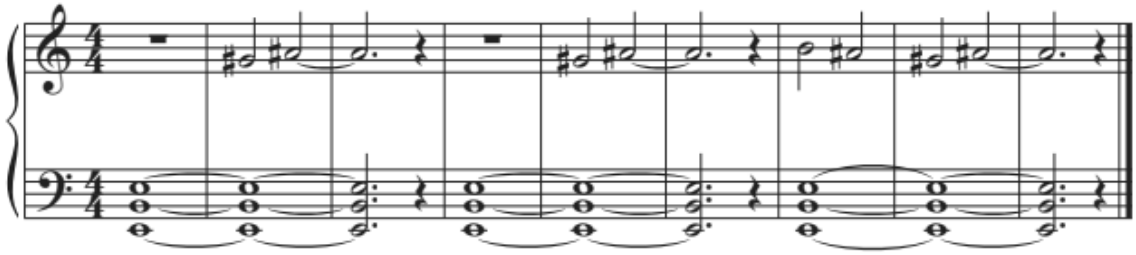
Example 24 – Hexachord Dissonances in the "Village Theme"



II. Exploratory Themes

Two cues in *Escape Beneath* emulate some of Schyman's sparse elements. The "Exploratory Theme" in *Escape Beneath* only uses violin, viola, cello, and bass sections with long, sustaining notes, as seen in the score on pages 83-85. The cue has an overall Lydian feel, but not exclusively. This cue in particular is used within environments that are brighter within the game and are a part of the main world, not the areas within the caverns or lower dungeons. Because of this, the cue has a consonant and light sound. The influence of the Lydian feel comes from the opening of Schyman's cue "End of the Tunnel" from *Torn*. While traversing parts of the world of *Escape Beneath*, not every part of the game is in a dismal state - there is still a sense of fantasy to it. The beginning Lydian tonality creates a hopeful and fantastical sound over an E5 chord (ex. 25).

Example 25 – Lydian Tonality in the "Exploratory Theme" (Reduction)



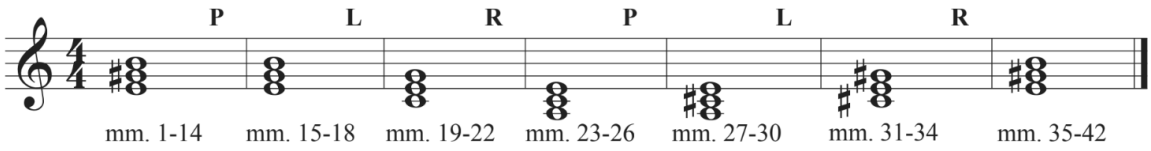
As an overworld and exploratory theme, the cue was to be more atmospheric and not melodic. Although there is more motion in the upper register of the piece, it is still quite reserved. Schyman's "End of the Tunnel" reacts in similar ways in its opening; the chord progression is the main focus, not a traditional melody. *Escape Beneath's* "Exploratory Theme" is meant to have a similar reservation and enhance the player's experience, not distract them.

To ensure that "Exploratory Theme" does not distract the player, the harmonic progression of the piece moves slowly, typically changing chords every four measures. Although the part of the intent was not to be distracting, I composed a chord progression based in Neo-Riemannian theory to create more variety in the progression. As a reference, the three most-common triadic transformations in Neo-Riemannian theory are the relative transformation (abbreviated as "R"), the parallel transformation (abbreviated as "P"), and the leading-tone exchange transformation (abbreviated as "L"). The R transformation preserves the triad's major third interval, the P transformation preserves

the triad's perfect fifth, and the L preserves the triad's minor third.[26] The "Exploratory Theme" is composed in a PLR cycle.

I chose to compose with PLR cycle to vary the tonalities and to have a way to return to the original tonic of E so that the cue effectively loops in the game. This is accomplished by using PLR twice (ex. 26).

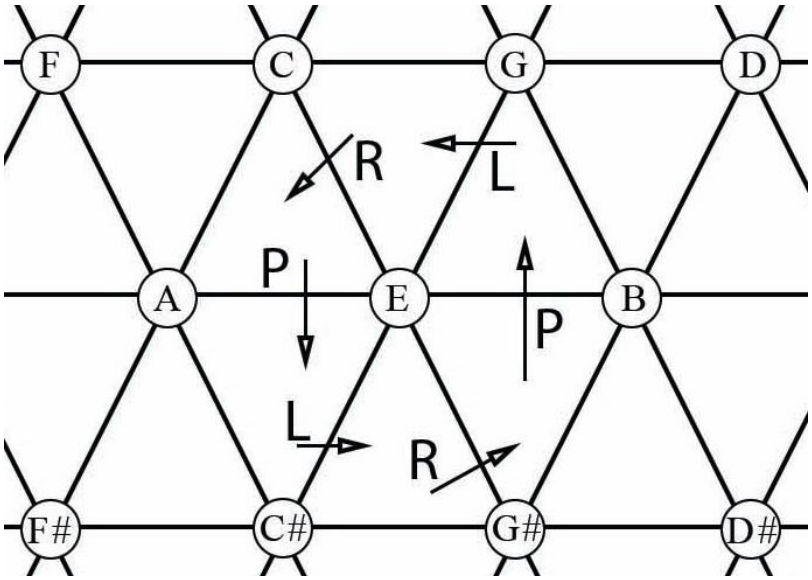
Example 26 - Harmonic Progression of the "Exploratory Theme"



Beginning with the E major chord, the PLR paths are viewable in a Neo-Riemannian tonnetz (ex. 27).

26. Daniel Christopher Obluda, "Topics in Hollywood Scores: Using Topic Theory to Expand on Recent Neo-Riemannian Analyses of Film Music" (PhD diss., University of Colorado at Boulder, 2021), 20-34, ProQuest Dissertations & Theses Global.

Example 27 – “Exploratory Theme” Tonnetz



The “Dungeon Theme” for *Escape Beneath* is also sparse in its material and orchestration, as seen in the score on page 82. This cue is 41 beats per minute. The average slowest tempo a human can perceive is 33 beats per minute and, at 41 beats per minute, this cue approaches that threshold.[27] This slow speed makes it difficult for the player to feel any overall pulse and contributes to the dark atmosphere of the environment.

One of the elements that I used to help destabilize the tempo of the cue was the low percussion. Notated rhythms are approximate in the score but are ultimately up to the player, as noted in m. 1 of the score with the “Taiko drum rhythms are approximate but

27. Fraisse, *The Psychology of Time* (January 1963), quoted in Adam Neely “What is the Slowest Music Humanly Possibly?” January 22, 2018, YouTube video, 2:00-2:13. https://www.youtube.com/watch?v=afhSDK5DJqA&t=661s.

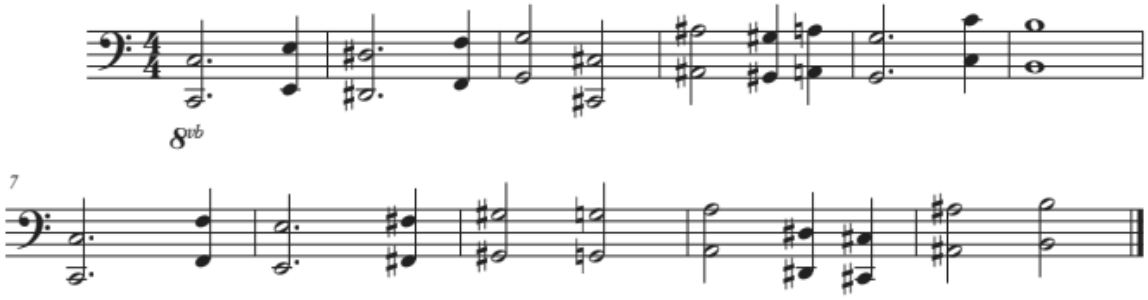
not fixed" marking in m. 1. In the recorded track, I performed virtual low-Taiko drums into the DAW and left it unquantized. Although Schyman mentioned doing a similar thing with the percussion in the "Aleatoric Combat" cue for *BioShock Infinite,*[28] this cue utilizes that approach in an atmospheric context instead of an action/combat context. [29] The sporadic hits create a spatial effect. The space and soft dynamics hint that someone or something is lurking in the darkness. Digital reverb and echoing delay emulate the effect of the sounds reverberating off of the dungeon's walls.

As a dungeon scene in a dark virtual world, a variety of musical techniques come into play to reinforce the feeling of foreboding and unease. I used an atonal melodic figure in the piano and low strings along with reverb and delay effects to match the setting. Both major and minor seconds are the primary intervals throughout the cue. These small interval motions are used to illustrate the lurking effect of the darkness in the dungeon (ex. 28).

28. *BioShock Infinite*: Scoring in the Sky, a Postmortem." Presented by Garry Schyman.

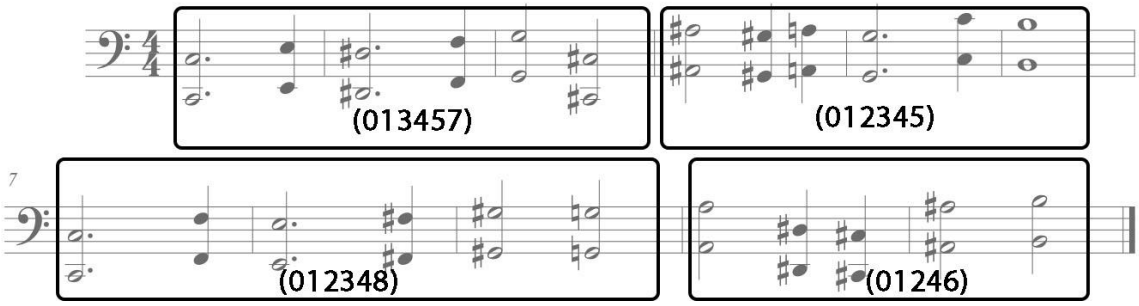
29. Ibid.

Example 28 – Chromatic Melody in the "Dungeon Theme"



In this chromatic melody, I analyzed the groupings in a variety of ways; however, the ones that yielded the most interesting results are the hexachords and pentachords (three hexachords and one pentachord total). The hexachords are (013457), (012345), and (012348) pitch-class sets, and the pentachord is a (01246) pitch-class set (ex. 29).

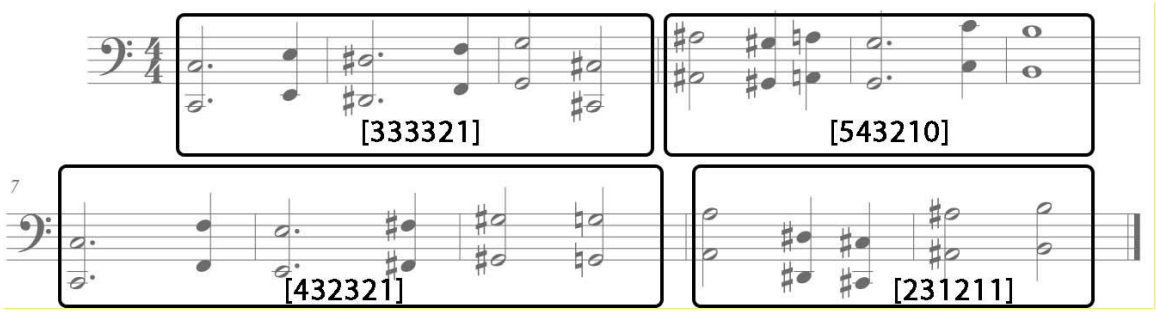
Example 29 – Pitch-Class Sets in the Chromatic "Dungeon Theme"



Similar cues have revealed an emphasis on seconds and dissonance. Although the same can be said about these pitch-class sets, there are interval vectors that are more varied than the other cues. In the (013457) hexachord, there is an interval vector of [333321] (ex. 30). All interval combinations are present, but the seconds and thirds are balanced with each other. Regarding its overall dissonance, there are seven dissonant intervals and eight consonant intervals. This is the first instance of a hexachord that has

more consonant sounds than dissonant. The (012345) hexachord has an interval vector of [543210]. Although there are no tritones in this hexachord (like in the previous), there are more dissonances present. This hexachord has nine dissonances and six consonances. The final hexachord has an interval vector of [432321], which balances consonance and dissonance. There are eight consonant intervals and eight dissonant intervals. With this succession of hexachords, the melody moves from most consonant, to most dissonant, to balanced. The final pentachord does introduce more dissonance back into the melody (as seen in its interval vector of [231211]) but this prepares for the arrival of the (013457) hexachord as the loop repeats.

Example 30 – Interval Vectors in the Chromatic "Dungeon Theme"



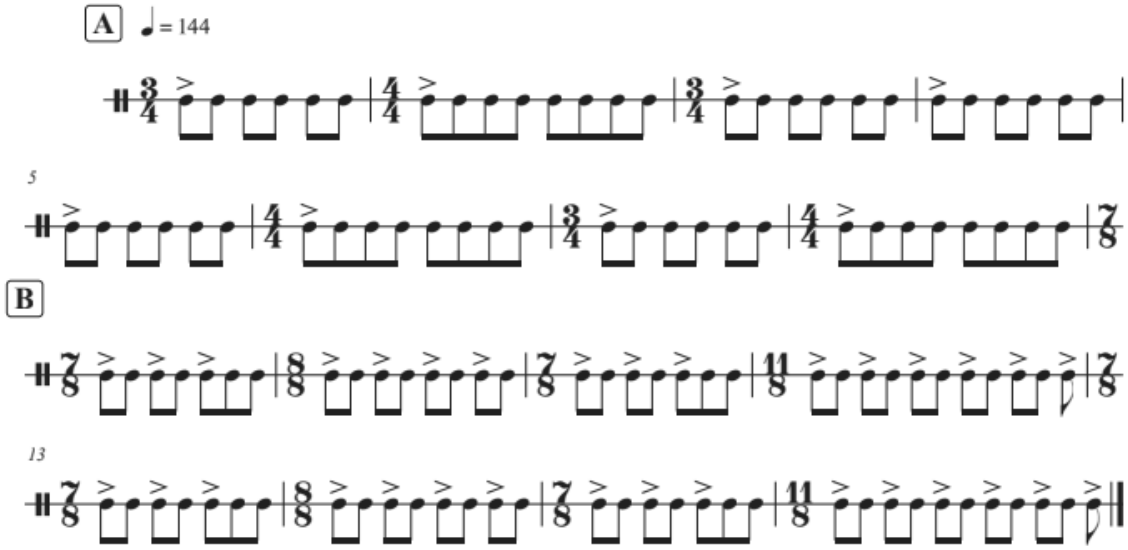
III. General Combat

The enemies in *Escape Beneath* take many forms: normal grunts, fierce elites, and powerful bosses. I created the "Combat Theme" cue (full-score on pages 70-81) with three different levels of intensity for use when the player encounters non-boss enemies. The combat within Escape Beneath is a hybrid of *BioShock Inifinite* and *Middle-Earth:*

Shadow of War. There are times that it can be fast-paced, dependent on weapon and magic combinations, and intense due to large, enemy hordes (all reminiscent of *BioShock Infinite*); but it also has a weighted feel (similar to *Middle-Earth: Shadow of War*). The cue is in an ABA form with the A section in the key of C minor and the B section in B Phrygian.

The three different levels of intensity are three distinct layers of instruments and motifs. The base layer within the "Combat Theme," which is present at all three levels of intensity, is an ostinato pattern in the lower strings. This ostinato establishes a steady pulse; however, to create uncertainty within the pulse, meters change quickly and frequently between 4/4, 3/4, 7/8, 8/8, and 11/8. A concern that I had for this cue was "how can music drive, not be totally anticipated, and influence but not distract the player?" I also wanted to create a similar chaotic feel to Schyman's "Combat Aleatoric" percussion from *BioShock Infinite*. As I played various percussion parts into my DAW and left them unquantized, it felt that there was not a solid connection between the melodic material and the percussion. This could be because the melodic line in the cellos were the first part composed, and the meter changes were written with it. When I determined that they were not effectively working together, I scaled the percussion back and had it perform more of a groove than a spontaneous rhythm. The rhythmic subdivisions in the strings do provide some stability and the drive of the action, but the accent changes through the meter changes rhythmically displace the downbeat and gave me the effect that I ultimately wanted (ex. 31).

Example 31 – Accents within “General Combat”



The second layer of the “Combat Theme” begins as combat intensifies more. This layer includes percussion (Taiko drums, bass drums, toms) to match the raising intensity. The final layer to trigger during combat is the loudest layer, the brass. This doubles the strings layer and is active when combat intensity is at its peak. This can include facing a large horde of enemies instead of just one. The brass doubling the strings was a decision made from discussions with the Dread Vector Studios team after the original layers were implemented. The original strings and percussion only cue did not deliver as high of an intensity level as desired by the team. Although they approved of the theme’s melody and rhythmic intensity, it did not seem bombastic enough to capture the essence of facing an enemy horde. That was when the brass section was introduced to the cue. It was a way to build the volume and intensity more, but without introducing additional material that may distract the player.

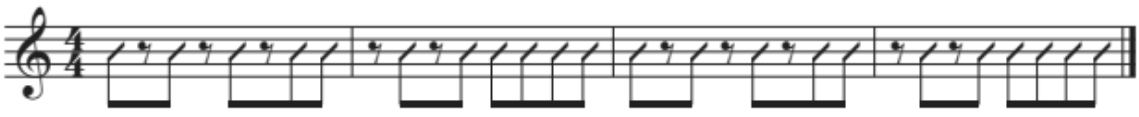
During this combat cue, aleatoric upper strings rise and fall at random with non-specified pitches. Performers are given ranges to play and *glissando* between, but the note choice, tremolo speed, and *glissando* speed is their decision. Schyman's "Combat Aleatoric" cue was influential in scoring this aspect of the cue, with tension created through this technique. This is representative of the chaos and disorder that may come in a combat game state.

IV. Boss Battle

The "Boss Theme" for the game makes use of some of the techniques that Schyman used in "The Arena" from *Middle-Earth: Shadow of War*. This cue is primarily in key of D locrian and uses an ABA' form (and is found on pages 59-69). As a boss battle theme, this cue is intended to create a feeling of adrenaline and terror to the player while they face the imposing boss of the level. Although they may not always be quick, the bosses within *Escape Beneath* can hit the player with an intense amount of brute strength. The bosses are also imposing in size and defensive, adding to the heaviness of the fight. This feel relates the boss fights of *Escape Beneath* more to *Middle-Earth: Shadow of War* than it does the *BioShock* games.

A rhythmic ostinato is used to ground the music into a pattern (ex. 32).

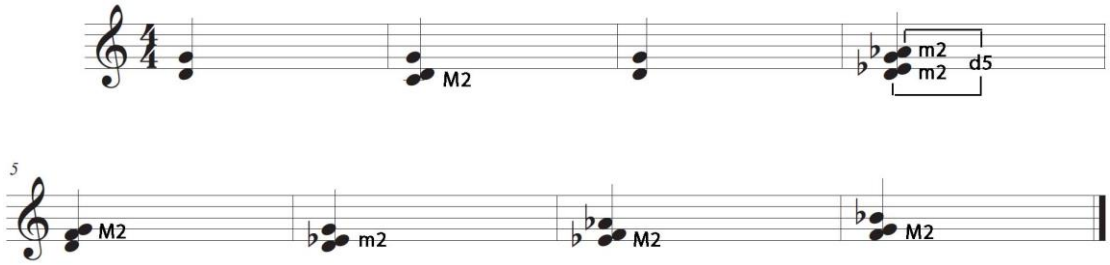
Example 32 – Ostinato Rhythm in "Boss Theme"



I used syncopation to rhythmically displace the downbeats every other measure. Although there is a counter rhythm present built upon straight eighth notes, the beats in the ostinato are syncopated to vary the pulse.

To create dissonance and tension, seconds occur more than any other interval within the cue (ex. 33). The minor 2nd between the root and the b2, as well as the minor 2nd between the 4 and b5, appear often within the cue. The minor 2nd, coupled with the inclusion of the tritone, create unrest and uneasiness in the video-game players. The intervals create discomfort in order to amplify the threat of the level's boss. In mm. 11-22, a small cluster of minor 2nds sound in the violins (Db, D, Eb, and E) with tremolo bowing. While the notes sustain, they slowly slide up a half-step their note and then a half-step below their note and back. This technique is similar to Schyman's quarter-step motions in the "Aleatoric Combat" cue from *BioShock Infinite*. The rising and falling shifts are notated within the measure, but the control of the pitch is still left to players to decide. They are instructed to move the pitch and bow as quickly as they can; it is okay for their speeds to be different in order to achieve more dissonance.

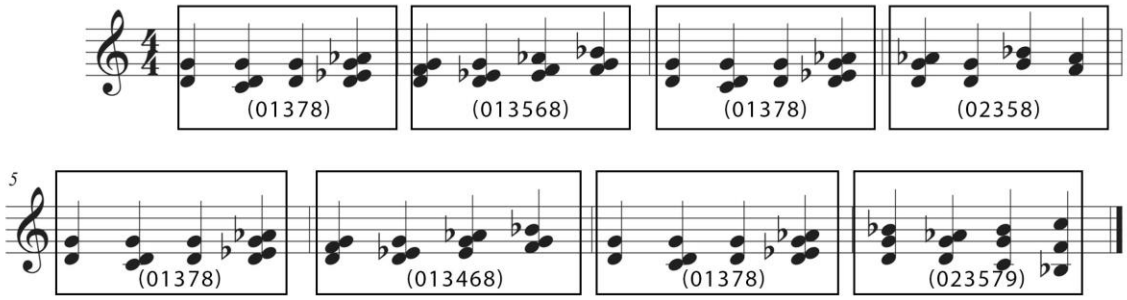
Example 33 – 2nds and Tritone Intervals within the "Boss Theme" mm. 1-8



During this ostinato in the A section, the viola lightly plays a countermelody to the ostinato. Seconds within this countermelody emphasize the dissonance. One of the most difficult tasks in writing this short countermelody was avoiding any accidental major tonalities. Because D was emphasized in the ostinato, I took care to avoid intervals that could create a major triad in the countermelody. Because I wanted to rely primarily on dissonant and minor sounds, I avoided major tonalities since I felt they might undermine the dissonance and tension within the countermelody.

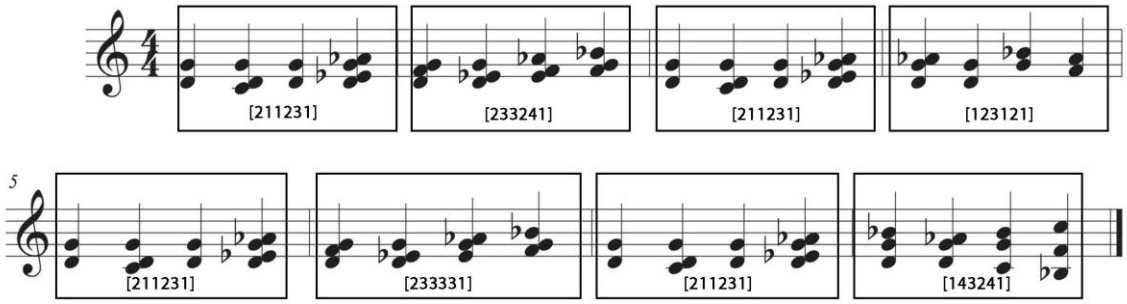
Despite emphasizing motions of seconds during the composing process, the pitch-class sets and interval vectors expose a surprising balance between the consonances and dissonances within the A and A' sections. Every other measure is an (01378) pentachord, which is the foundation of the phrase. Between each of these pentachords is a different pentachord or hexachord set. Measures 2, 6, and 8 utilize hexachords, (013568), (013468), (023579); whereas the fourth measure of the phrase is an (02358) pentachord (ex. 34).

Example 34 – Pitch-class Sets in the Boss Theme (Reduction)



Although these pentachords and hexachords contain dissonances, the interval vectors reveal more-balanced sets than the dissonances in my other cues. The (01378) pentachord has an interval vector of [211231] (ex. 35). In this set, there are an equal number of combinations of seconds and thirds. The remaining hexachord interval vectors are [233241], [233331], and [143241]; each including five possible combinations of seconds and five possible combinations of thirds. The (02358) pentachord is the one exception to balanced seconds and thirds. In this pentachord, the interval vector is [123121] which has one more possible combination of thirds than seconds. Adding to the dissonance, each set also contains a possible tritone; however, the dominating quartal voicings raise the consonances even higher than the dissonances. Even though I had composed this cue with the dissonances in mind, the interval vectors revealed that these sections ended up being more consonant than I had initially realized.

Example 35 – Interval Vectors in the Boss Theme (Reduction)



V. Chapter Conclusion

Although there are other cues that have been composed (and are still being composed) for *Escape Beneath*, these are the ones that were composed from the immediate research of this thesis. Schyman's cues "TC Reveal LONG Chromatic" and "Combat Aleatoric" were the two cues that had the greatest influence during the composing process. The aleatoric techniques and chromaticism control in those cues were an asset to capturing the darker nature of *Escape Beneath*. By incorporating those elements into the "Dungeon Theme," "Combat Theme," and "Boss Theme," the development team was excited to feel their game come to life. "Rena" from *Torn* and "TC Reveal LONG" from *BioShock Infinite* were also helpful when composing my more-consonant themes "Village Theme" and "Exploratory Theme." As *Escape Beneath* continues to develop, I am continuing to use this research during my composition process.

VI. Thesis Conclusion

This thesis examines elements of Garry Schyman's compositions for video games, specifically his use of chromatic harmony interwoven into diatonic harmony, approaches to orchestration, and utilization of aleatoric techniques. His ability to compose music for any situation and talent for tastefully combining opposite elements became more apparent than ever during my research. Although there is much that I have learned during the analysis of Schyman's cues, the control of dissonances and the use of

aleatoric textures have impacted me the most. In video games that I play and am drawn to compose for, I have begun to prefer composing for exploratory and combat elements within the fantasy and sci-fi genres. His utilization of the aleatoric techniques and chromaticism have taught me how these elements work within the genres and themes that I enjoy. These are techniques that are finding their way into the additional music that I am composing for *Escape Beneath* and will continue to utilize in my future video-game compositions.

During a conversation with him, Mr. Schyman reminded me that the music has to sound good; even light-heartedly stating during the interview "if you ask me why I used a particular note in a certain cue, my answer would probably be 'because it sounded good at the time.'"[30] All of these tools are helpful but music composition in games still has to sound good and support the stories, characters, and environments. As I studied his techniques and sought to apply them to my own scores, I continued to ask myself "Does this music support and convey the meaning of the game?" I used this question and the knowledge I learned while analyzing his cues to compose the music to *Escape Beneath* and I will continue to keep it to heart as I compose for future video games.

[30] Garry Schyman, interview by author, Rochester, NY, April 23, 2021.

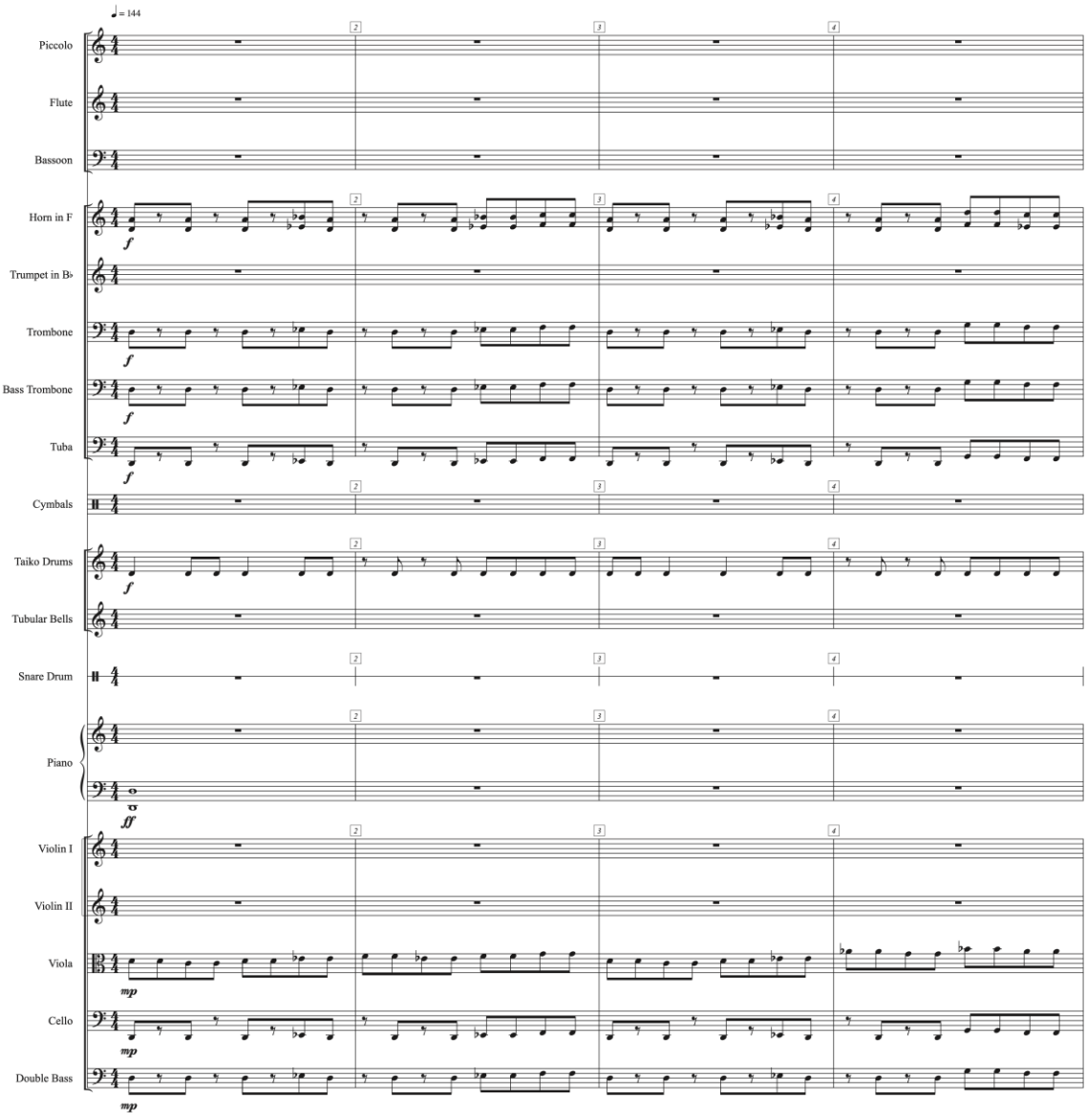
CHAPTER 4 – FULL MUSIC SCORE

Score

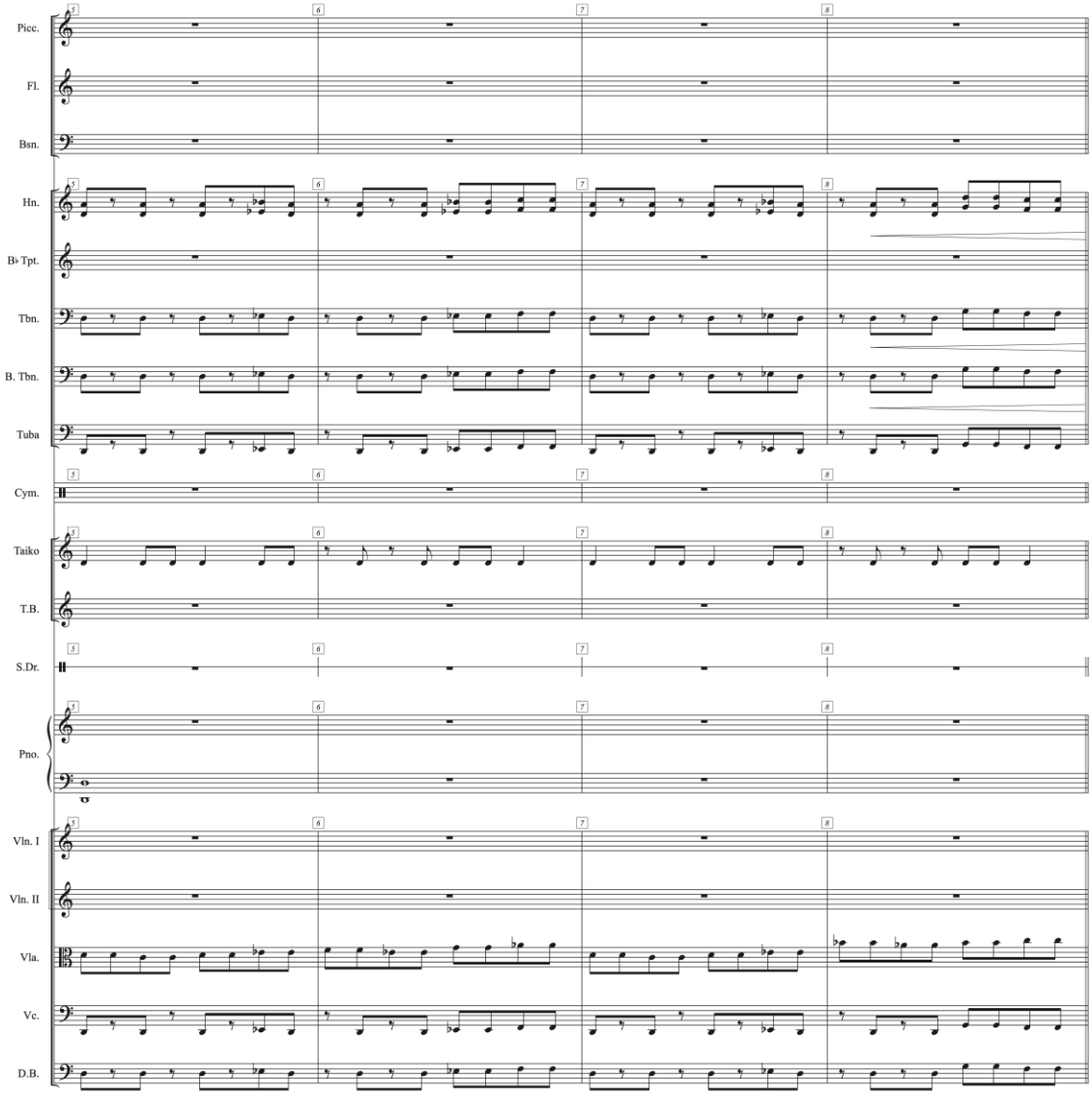
Boss Theme

from Escape Beneath

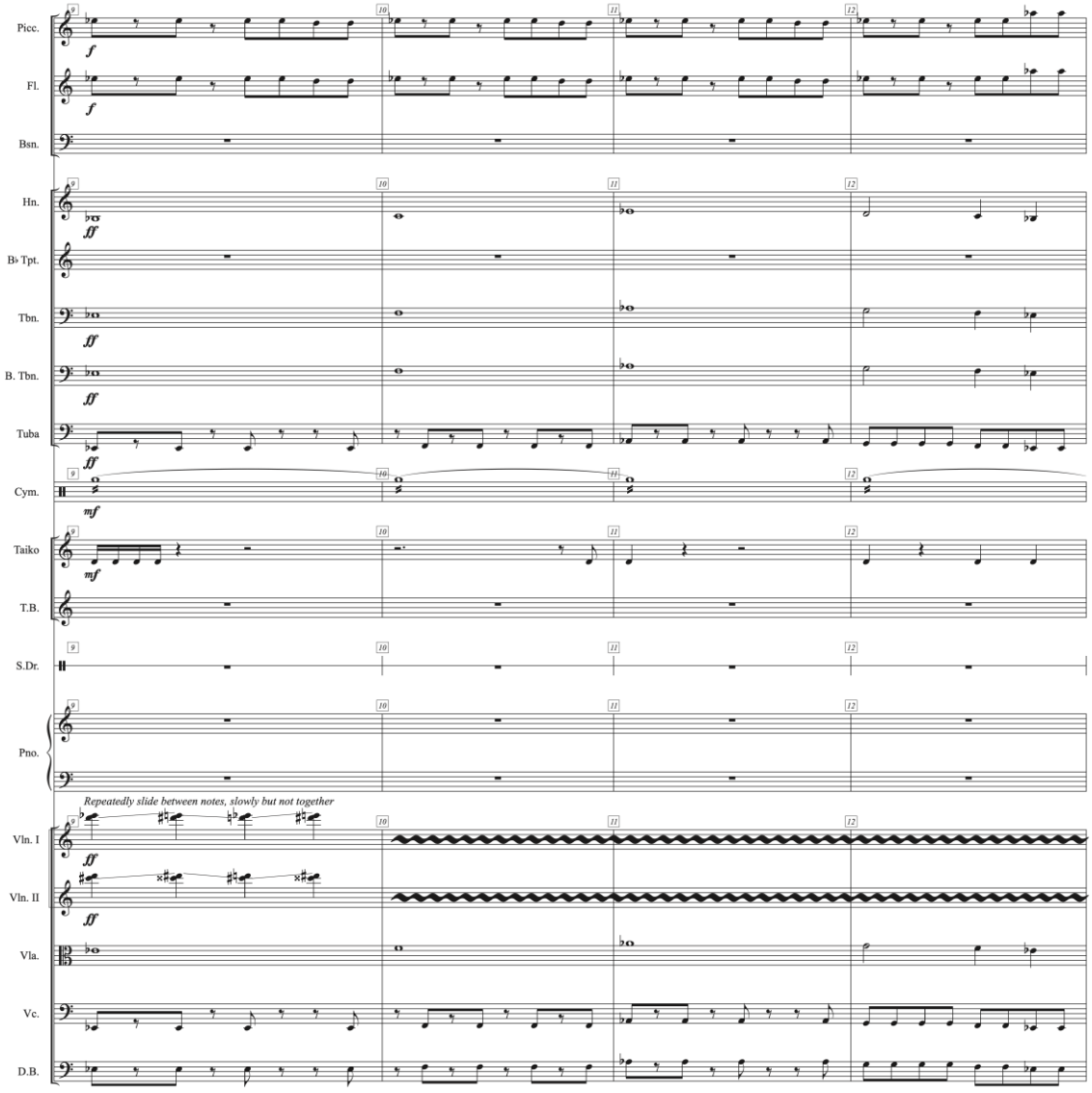
Dan Cooper



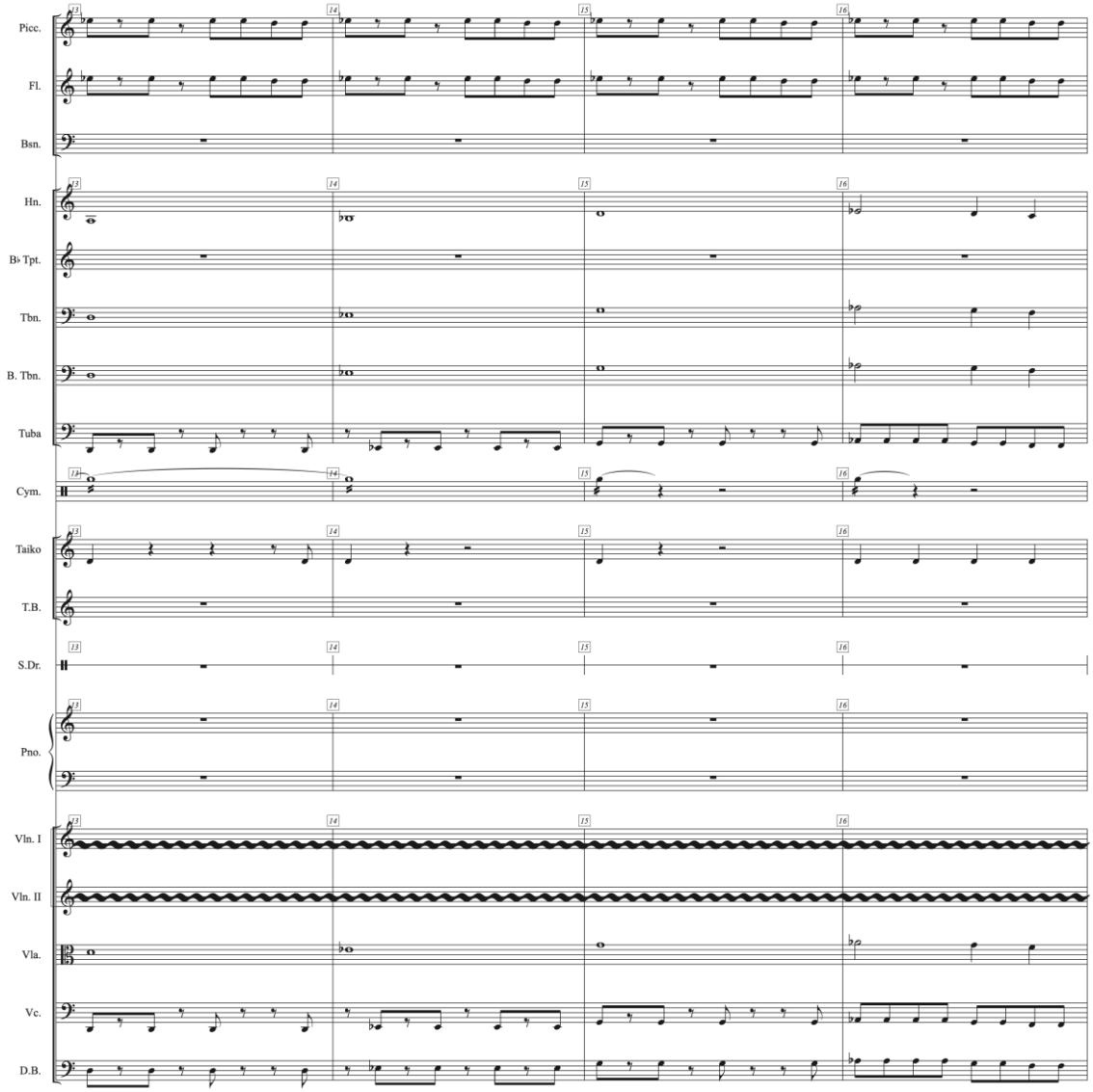
Boss Theme


Picc.
Fl.
Bsn.
Hn.
B♭ Tpt.
Tbn.
B. Tbn.
Tuba
Cym.
Taiko
T.B.
S.Dr.
Pno.
Vln. I
Vln. II
Vla.
Vc.
D.B.

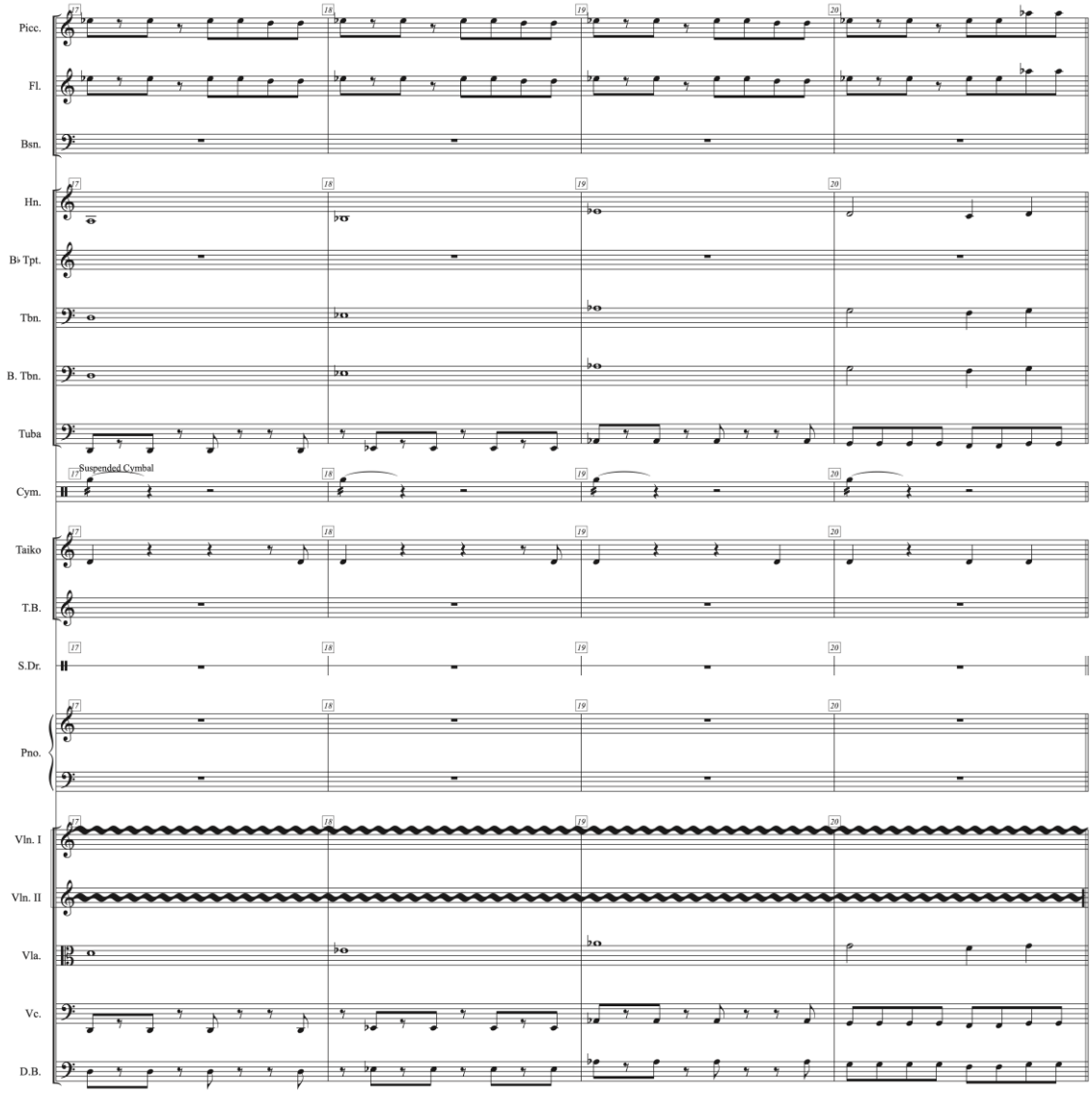
Boss Theme


Picc.
Fl.
Bsn.
Hn.
B♭ Tpt.
Tbn.
B. Tbn.
Tuba
Cym.
Taiko
T.B.
S.Dr.
Pno.
Vln. I
Vln. II
Vla.
Vc.
D.B.
Repeatedly slide between notes, slowly but not together

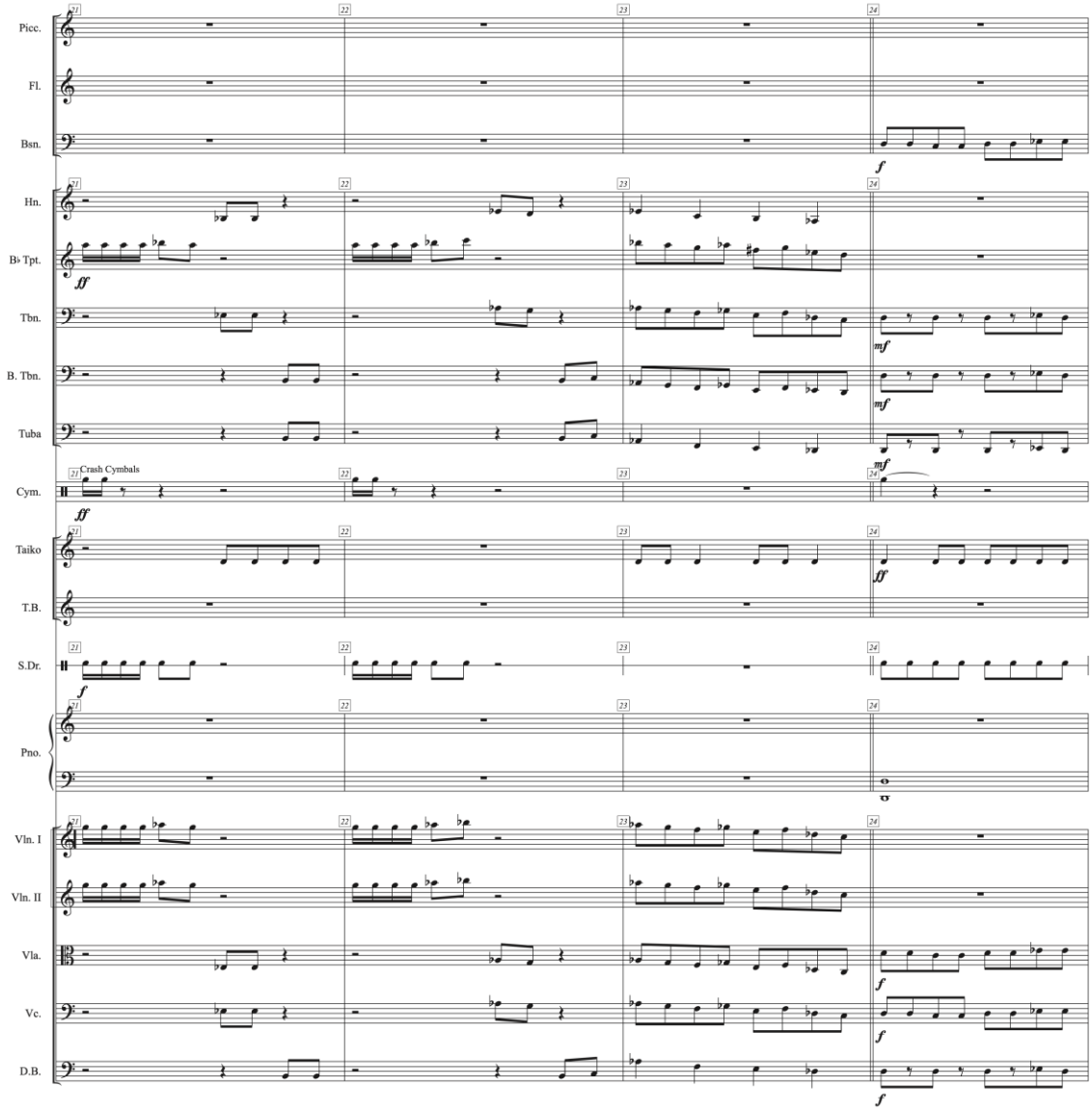
Boss Theme


Picc.
Fl.
Bsn.
Hn.
B♭ Tpt.
Tbn.
B. Tbn.
Tuba
Cym.
Taiko
T.B.
S.Dr.
Pno.
Vln. I
Vln. II
Vla.
Vc.
D.B.

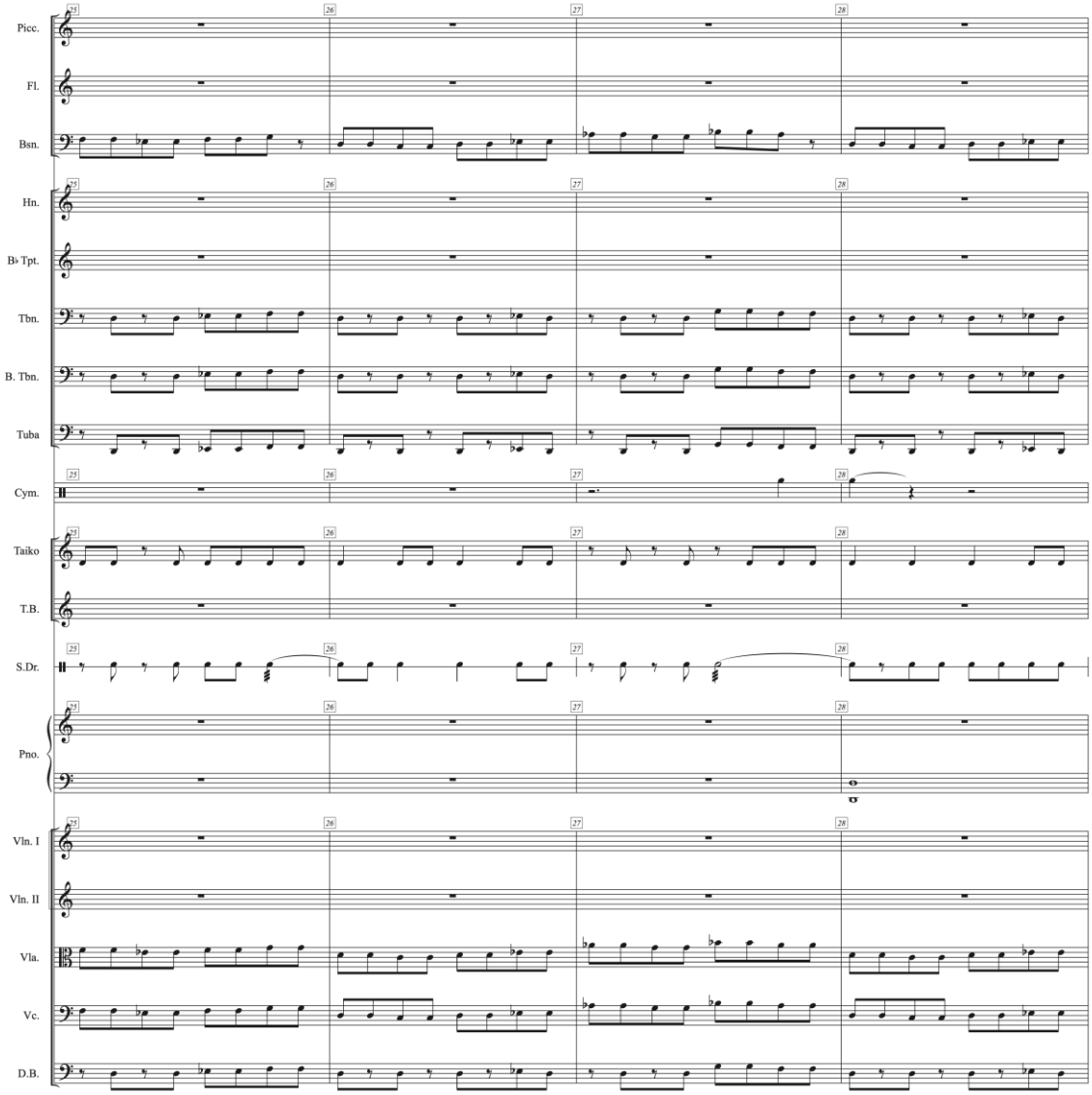
Boss Theme


Picc.
Fl.
Bsn.
Hn.
B♭ Tpt.
Tbn.
B. Tbn.
Tuba
Suspended Cymbal
Cym.
Taiko
T.B.
S.Dr.
Pno.
Vln. I
Vln. II
Vla.
Vc.
D.B.

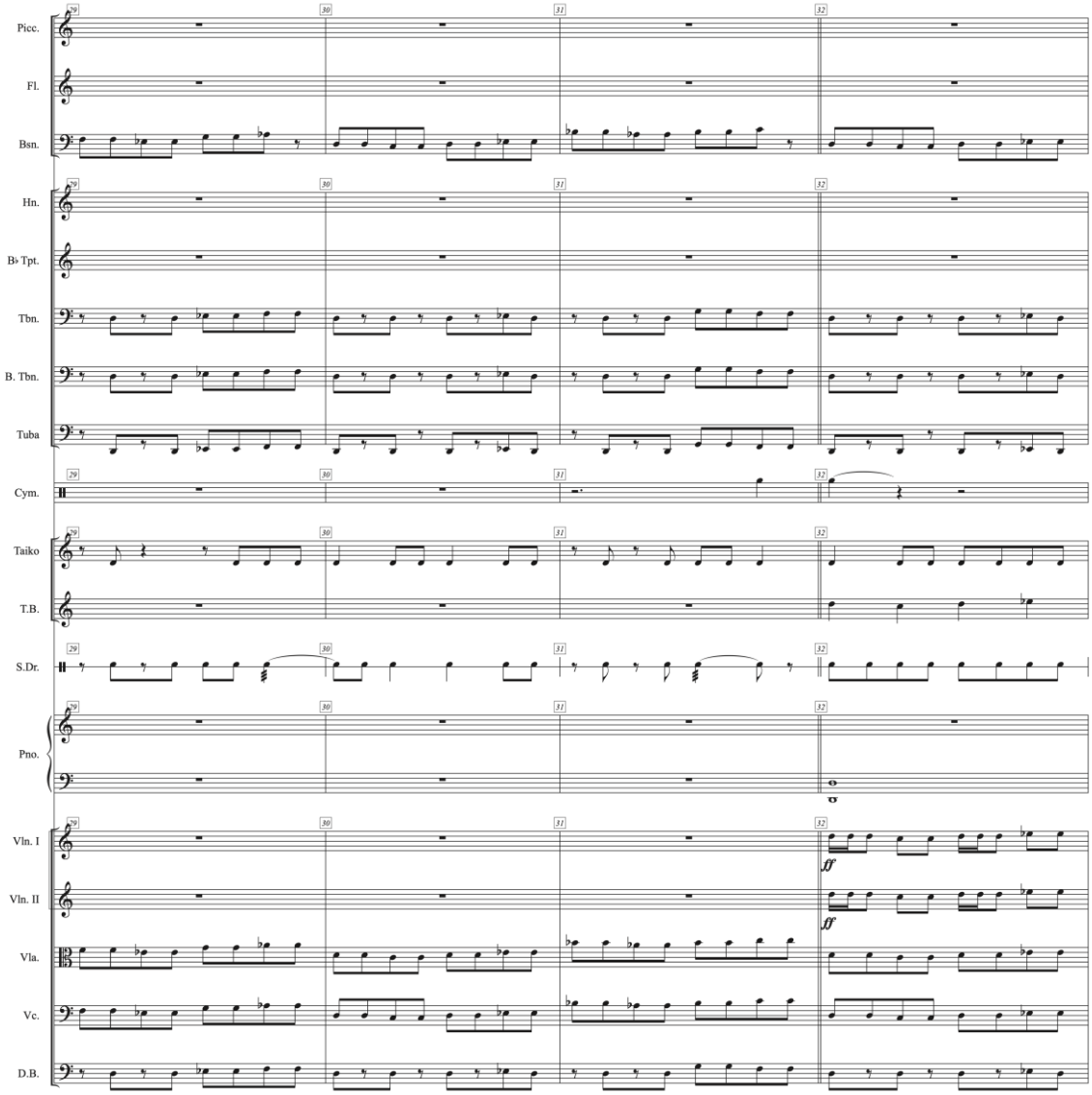
Boss Theme


Picc.
Fl.
Bsn.
Hn.
B♭ Tpt.
Tbn.
B. Tbn.
Tuba
Cym.
Crash Cymbals
Taiko
T.B.
S.Dr.
Pno.
Vln. I
Vln. II
Vla.
Vc.
D.B.

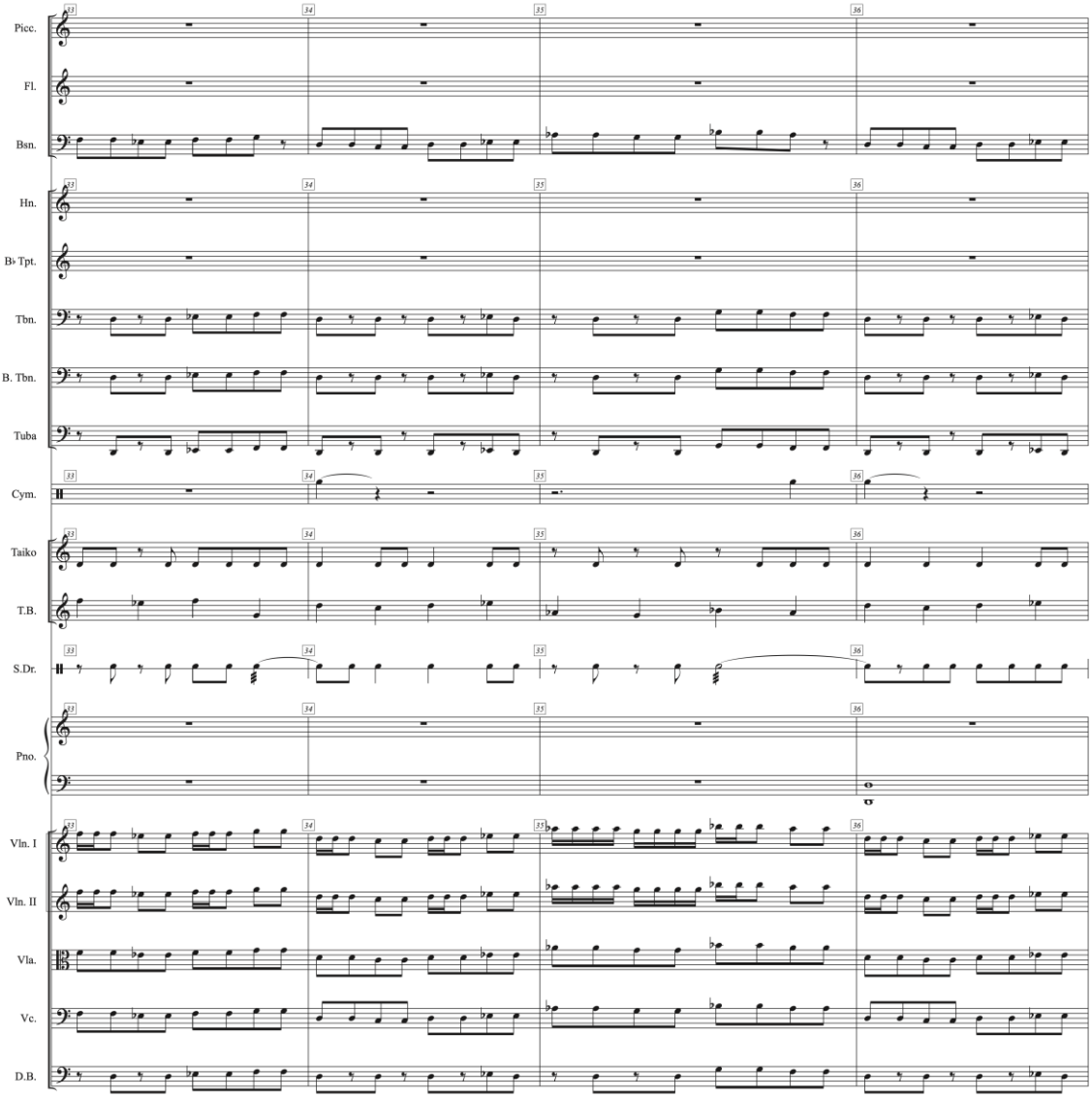
Boss Theme


Picc.
Fl.
Bsn.
Hn.
B♭ Tpt.
Tbn.
B. Tbn.
Tuba
Cym.
Taiko
T.B.
S.Dr.
Pno.
Vln. I
Vln. II
Vla.
Vc.
D.B.

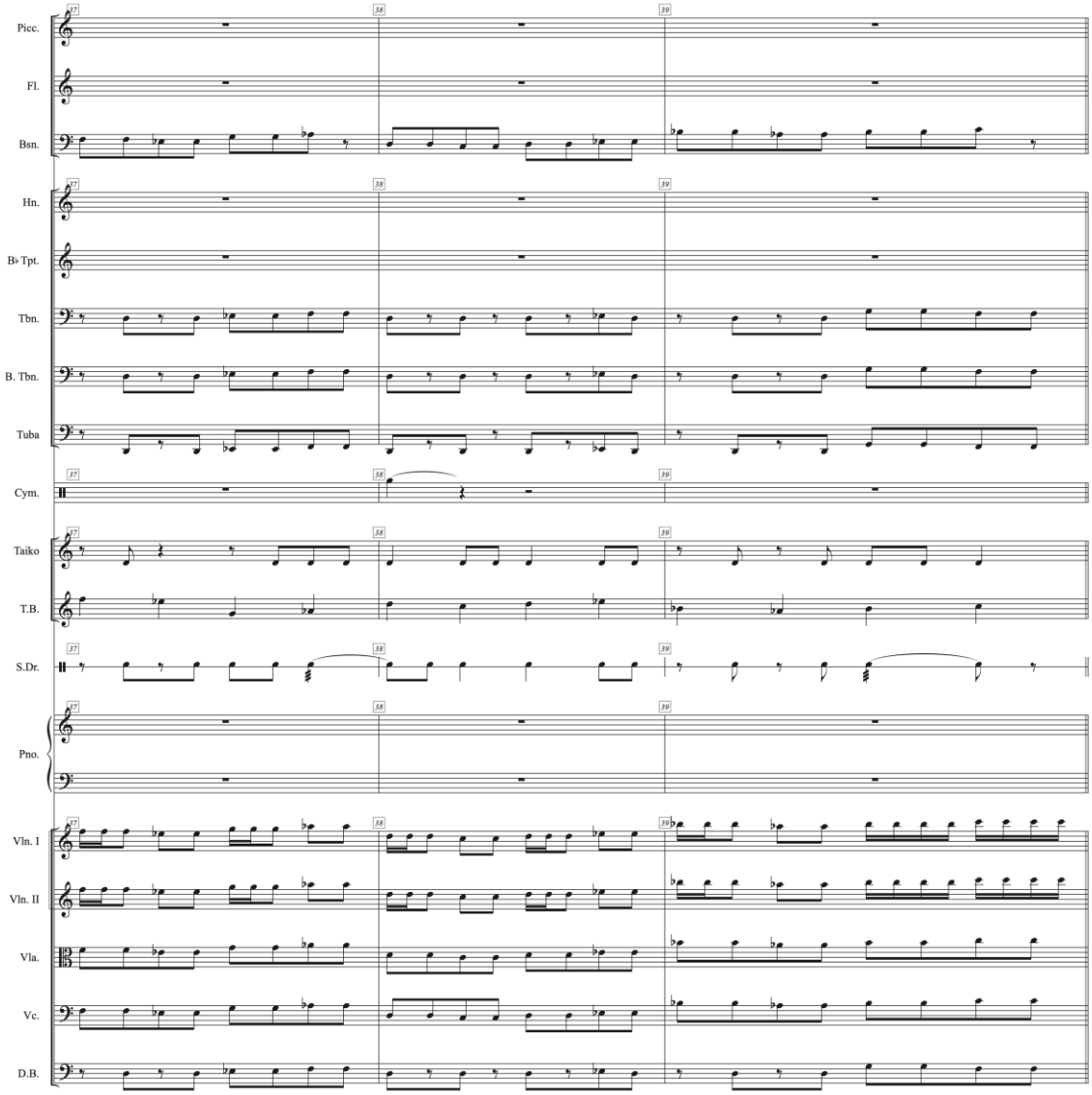
Boss Theme


Picc.
Fl.
Bsn.
Hn.
B♭ Tpt.
Tbn.
B. Tbn.
Tuba
Cym.
Taiko
T.B.
S.Dr.
Pno.
Vln. I
Vln. II
Vla.
Vc.
D.B.
29
30
31
32
ff
ff

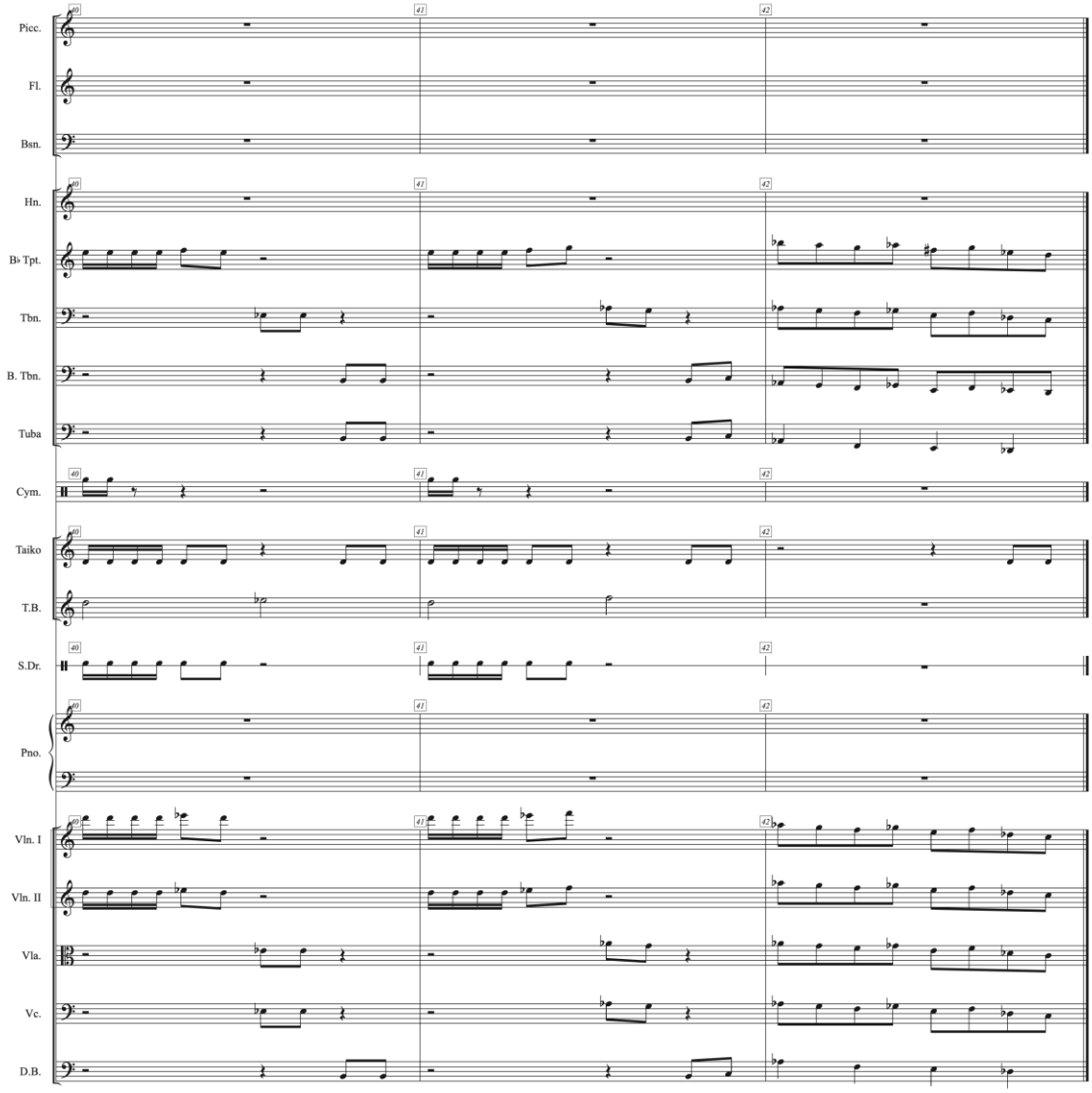
Boss Theme


Picc.
Fl.
Bsn.
Hn.
B♭ Tpt.
Tbn.
B. Tbn.
Tuba
Cym.
Taiko
T.B.
S.Dr.
Pno.
Vln. I
Vln. II
Vla.
Vc.
D.B.

Boss Theme


Picc.
Fl.
Bsn.
Hn.
B♭ Tpt.
Tbn.
B. Tbn.
Tuba
Cym.
Taiko
T.B.
S.Dr.
Pno.
Vln. I
Vln. II
Vla.
Vc.
D.B.

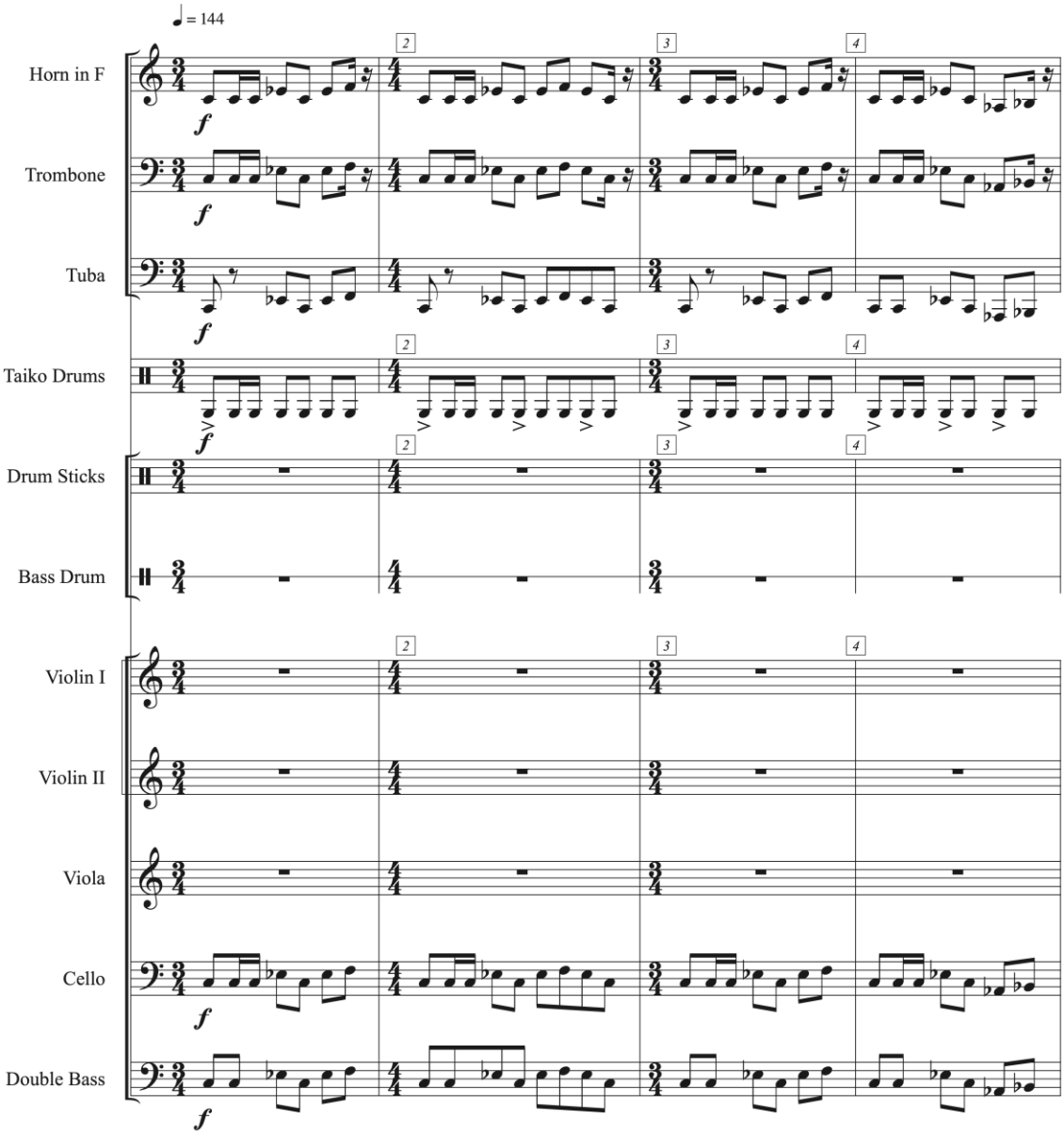
Boss Theme

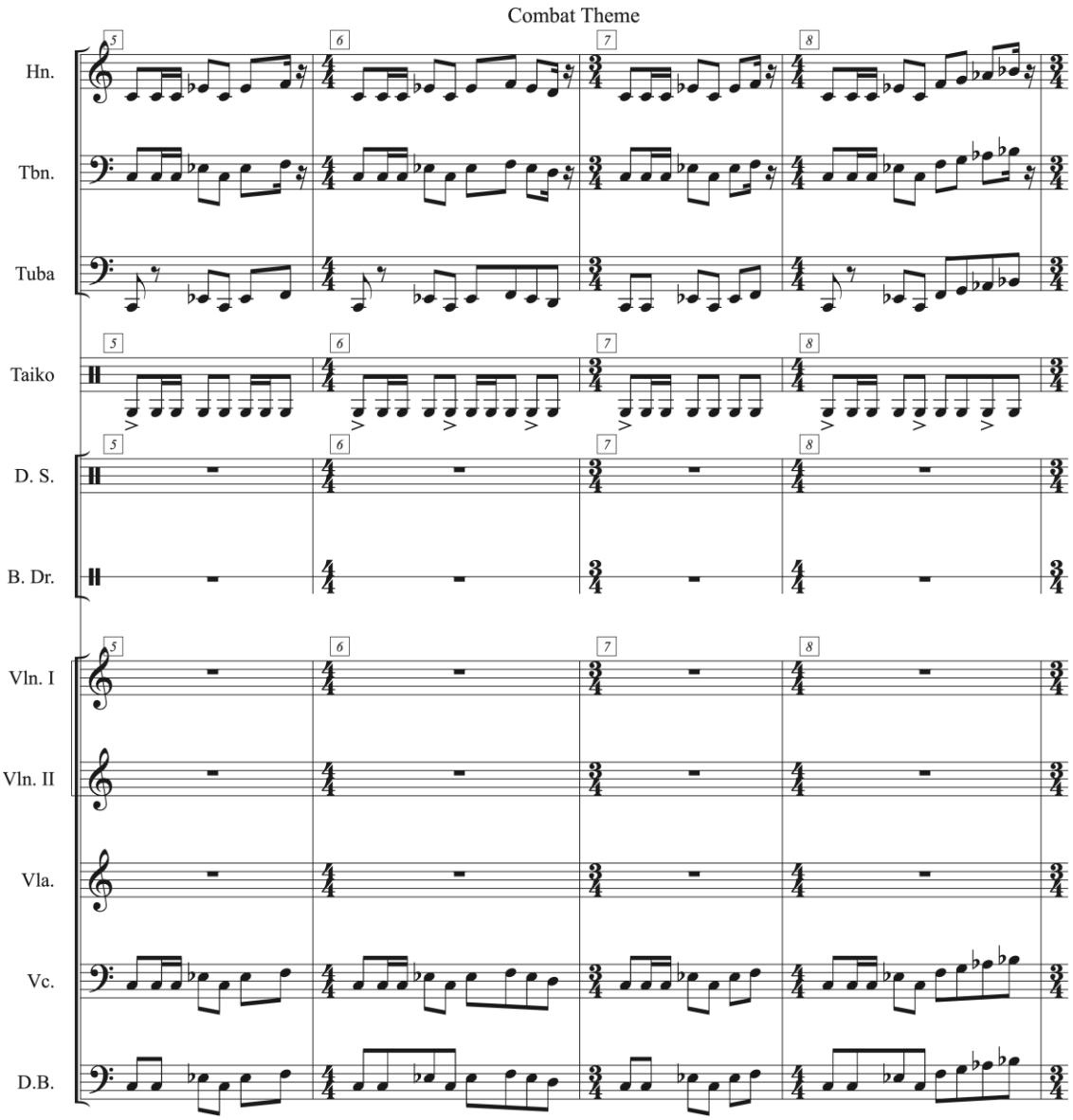

Picc.
Fl.
Bsn.
Hn.
B♭ Tpt.
Tbn.
B. Tbn.
Tuba
Cym.
Taiko
T.B.
S.Dr.
Pno.
Vln. I
Vln. II
Vla.
Vc.
D.B.

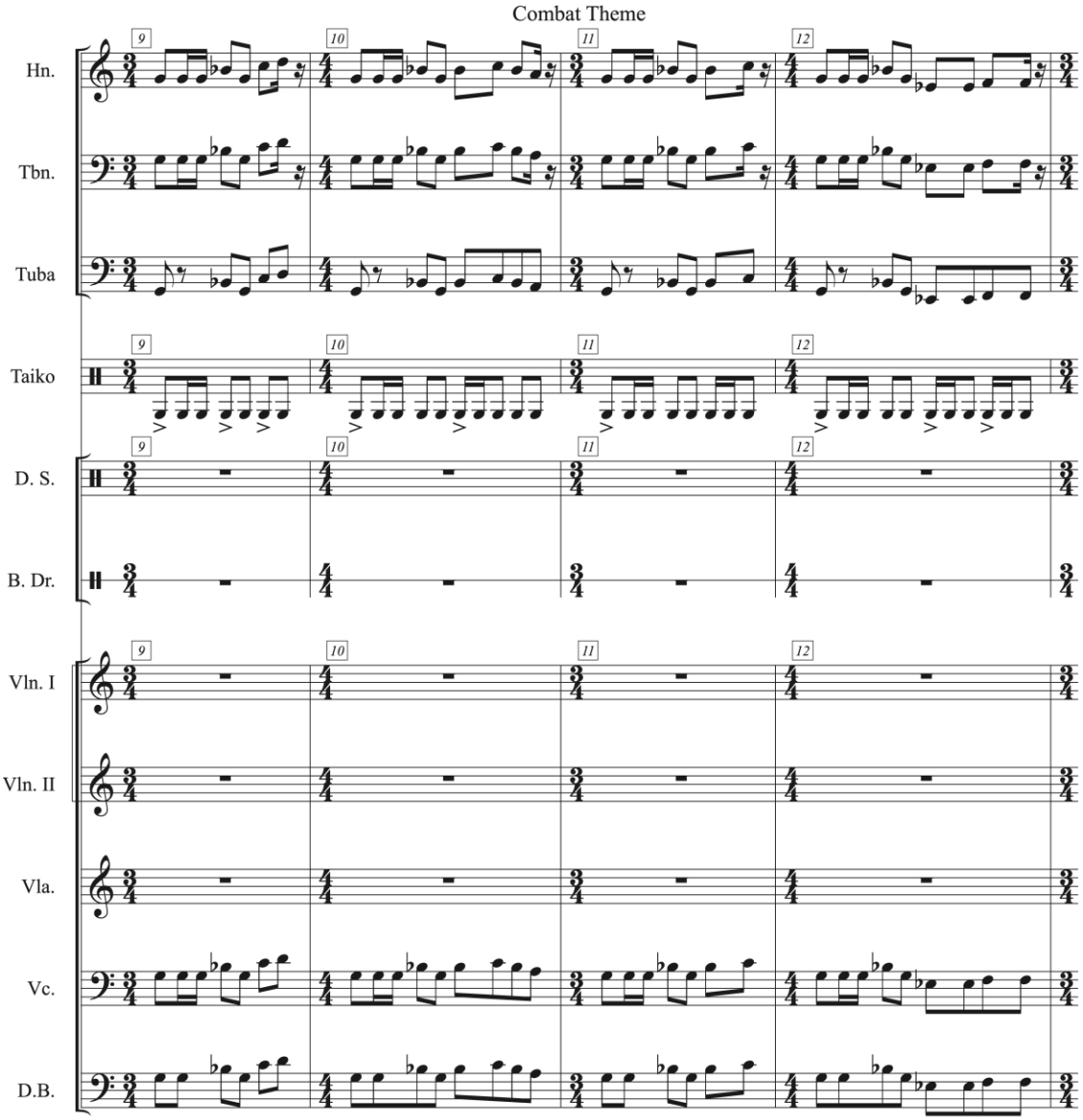
Score

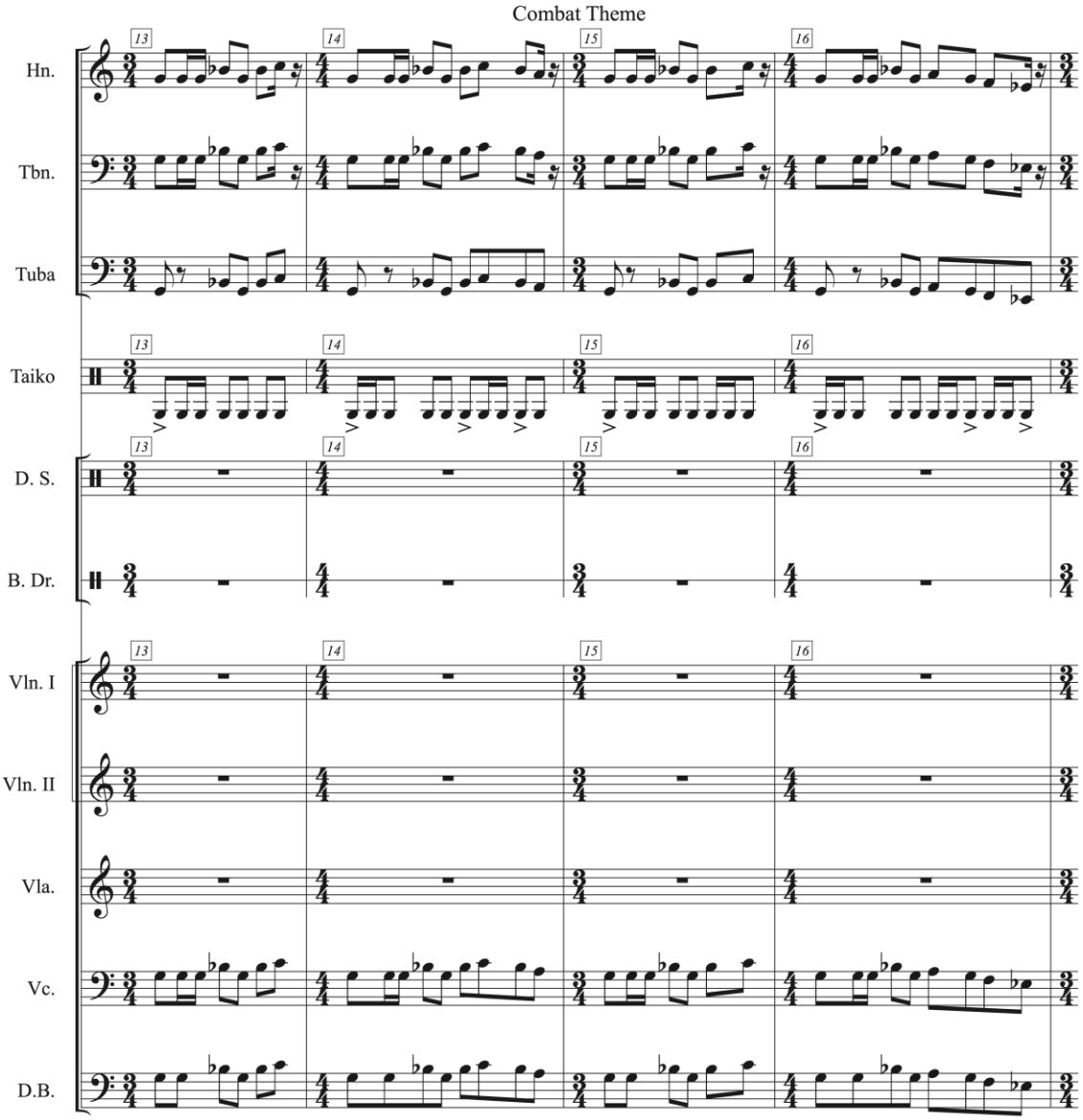
Combat Theme

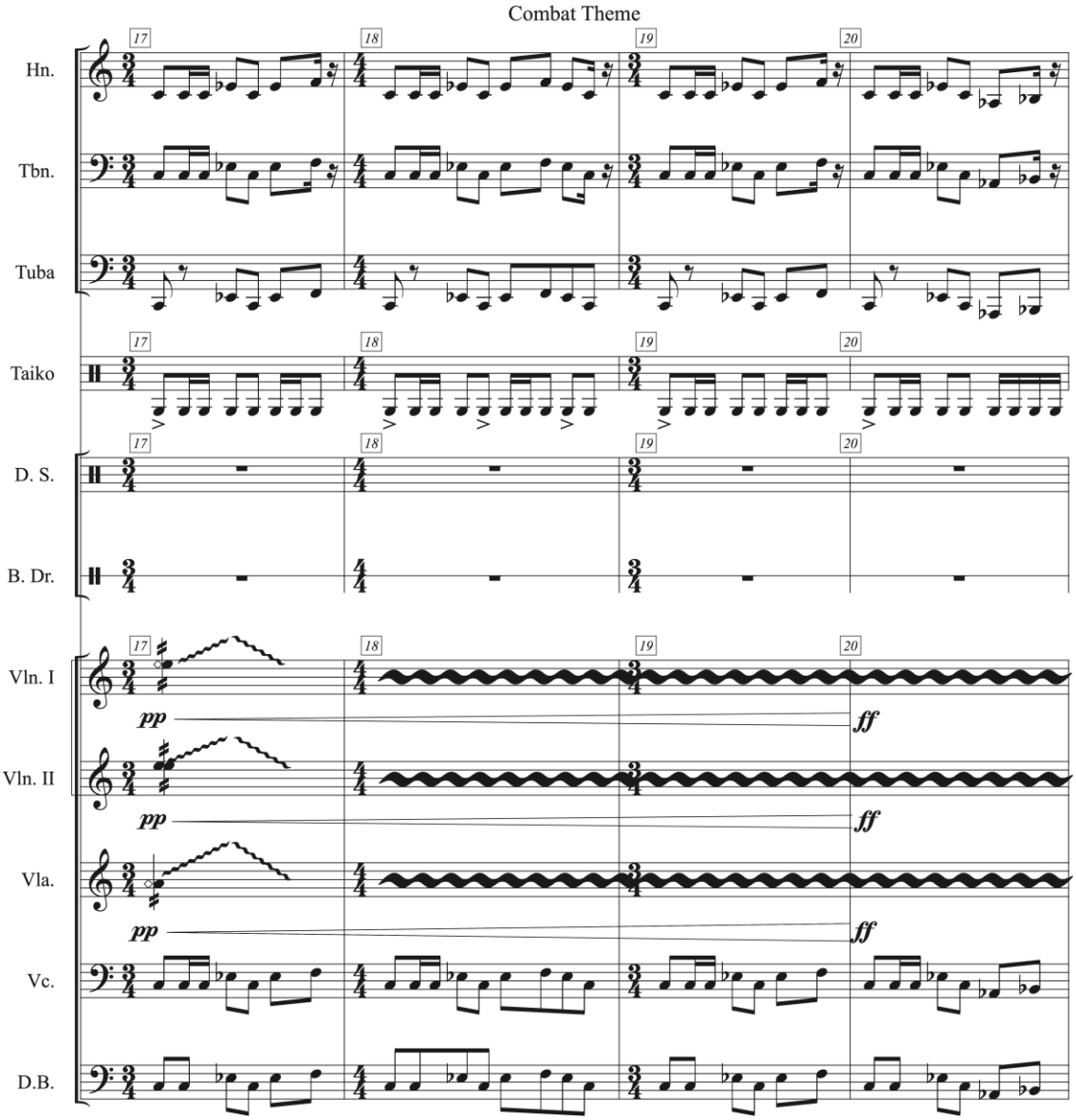
Dan Cooper

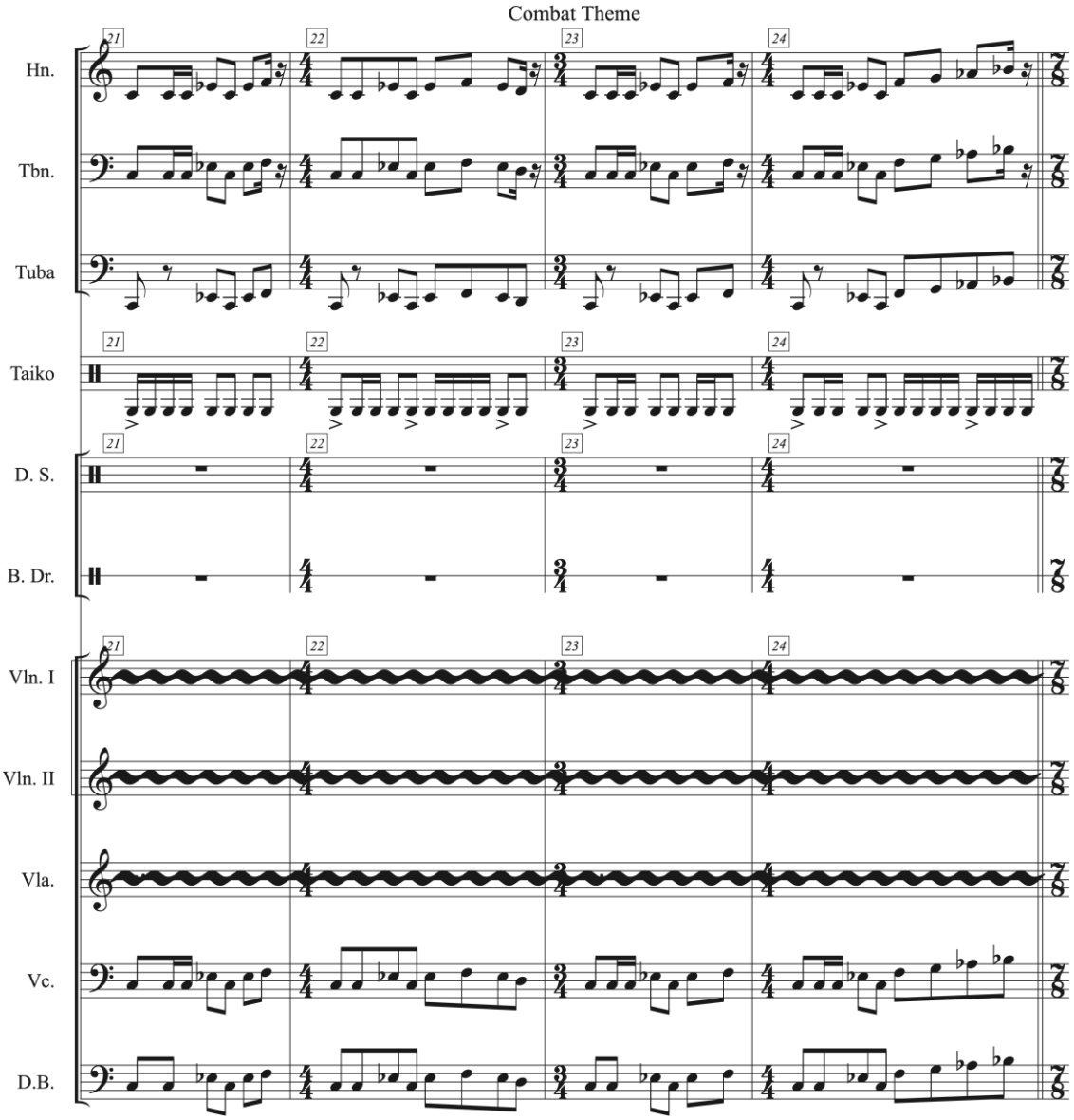


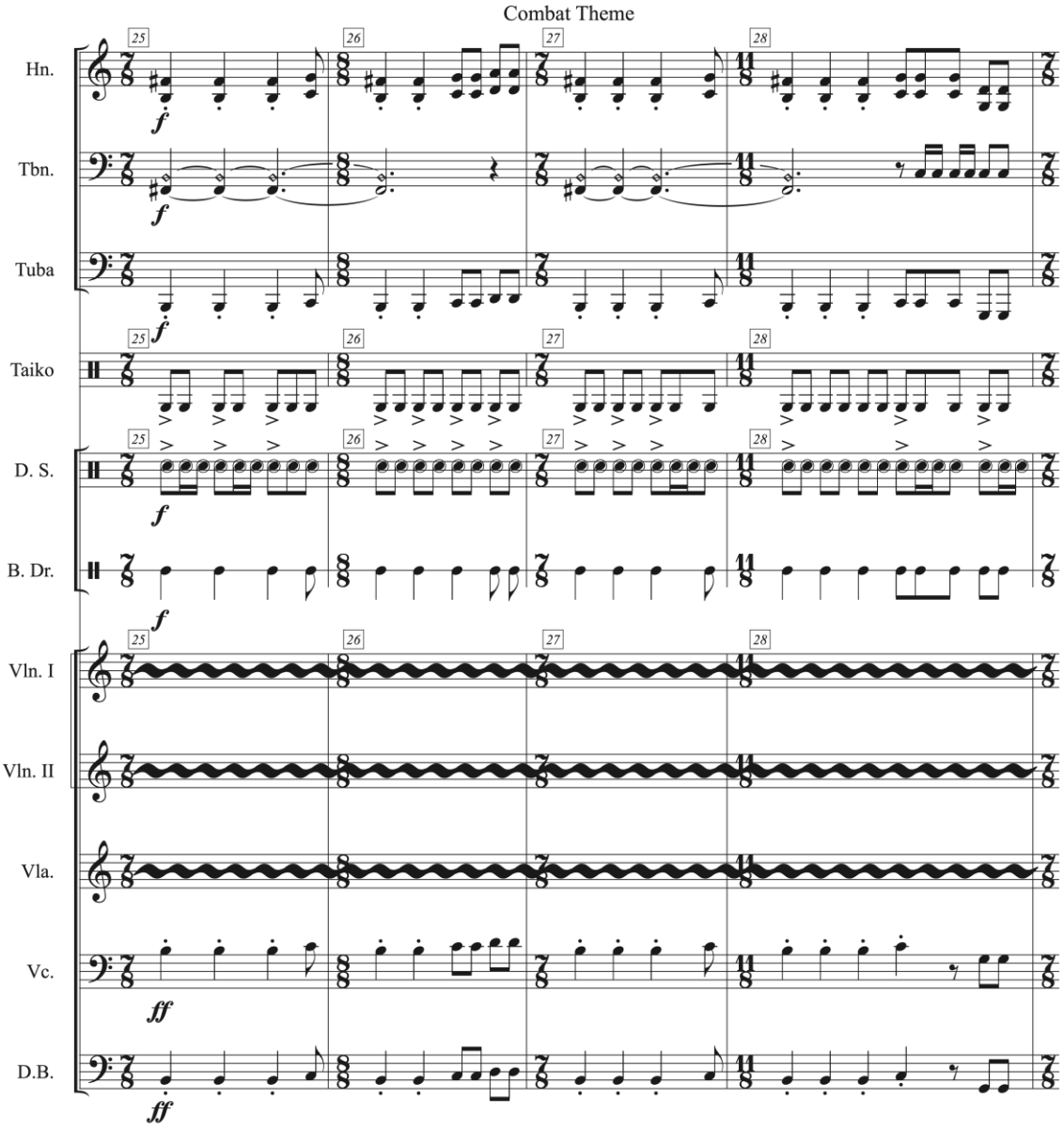

Combat Theme
Hn.
Tbn.
Tuba
Taiko
D. S.
B. Dr.
Vln. I
Vln. II
Vla.
Vc.
D.B.

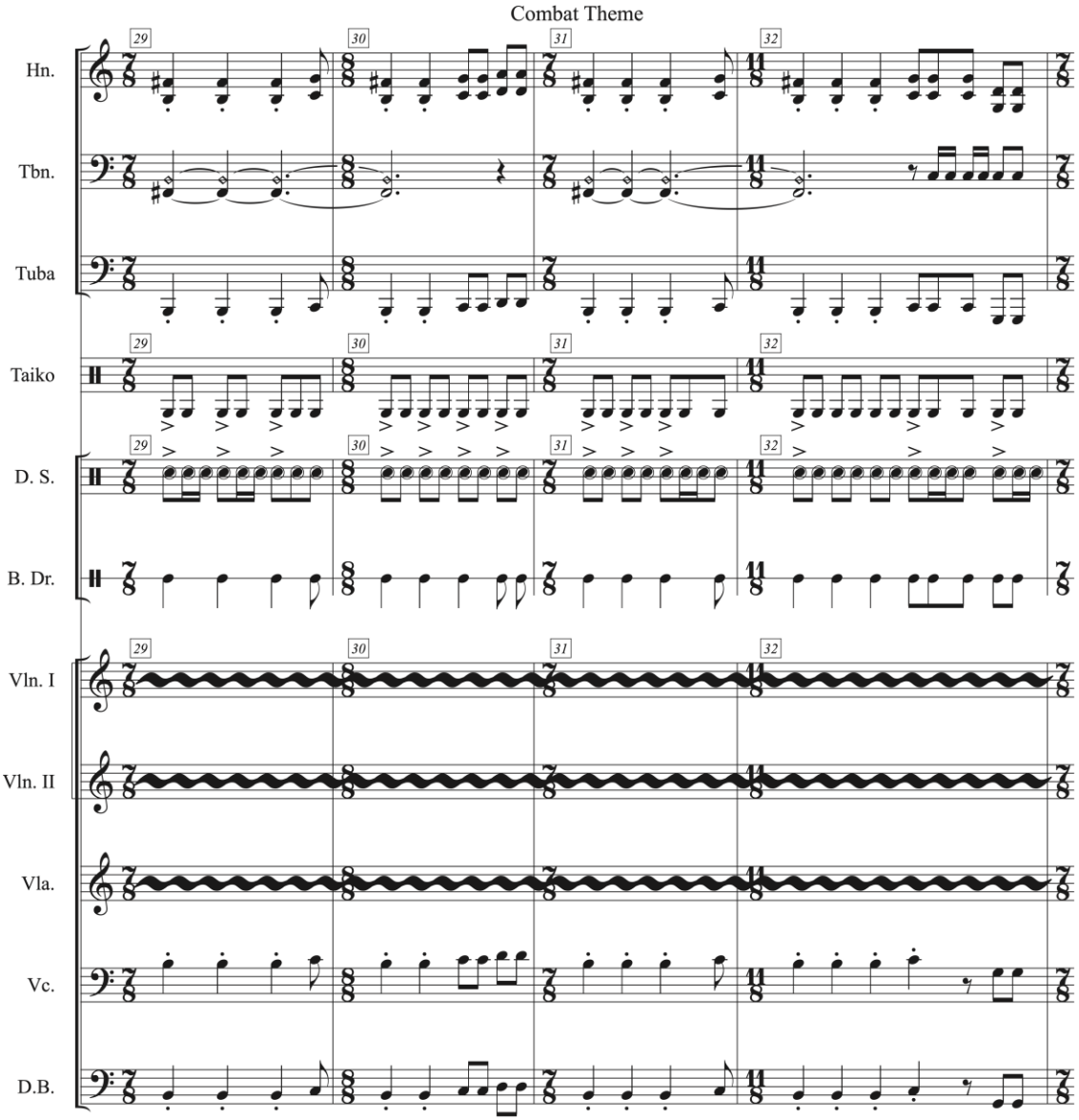

Combat Theme
Hn.
Tbn.
Tuba
Taiko
D. S.
B. Dr.
Vln. I
Vln. II
Vla.
Vc.
D.B.
9
10
11
12

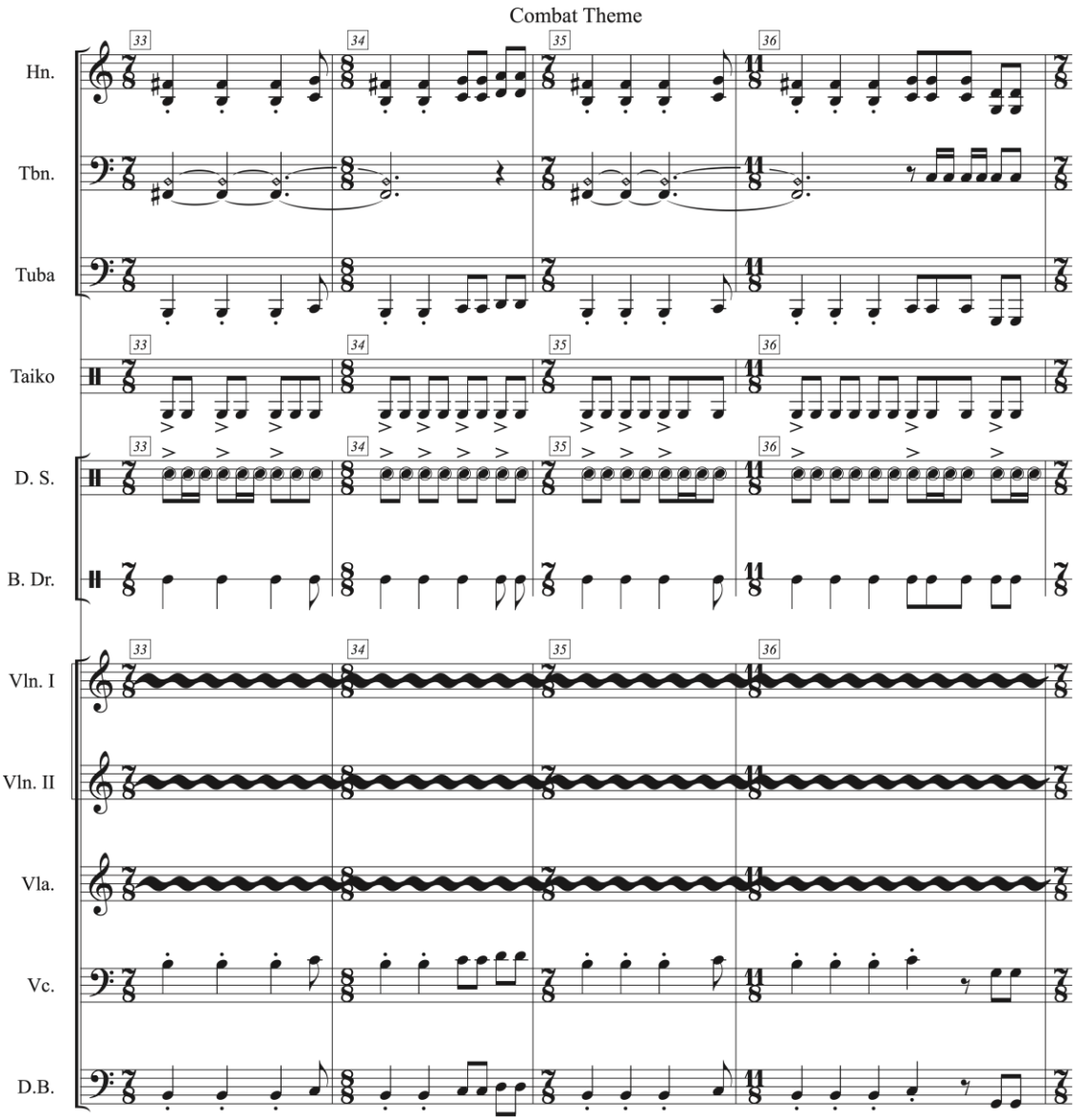

Combat Theme
Hn.
Tbn.
Tuba
Taiko
D. S.
B. Dr.
Vln. I
Vln. II
Vla.
Vc.
D.B.
13
14
15
16

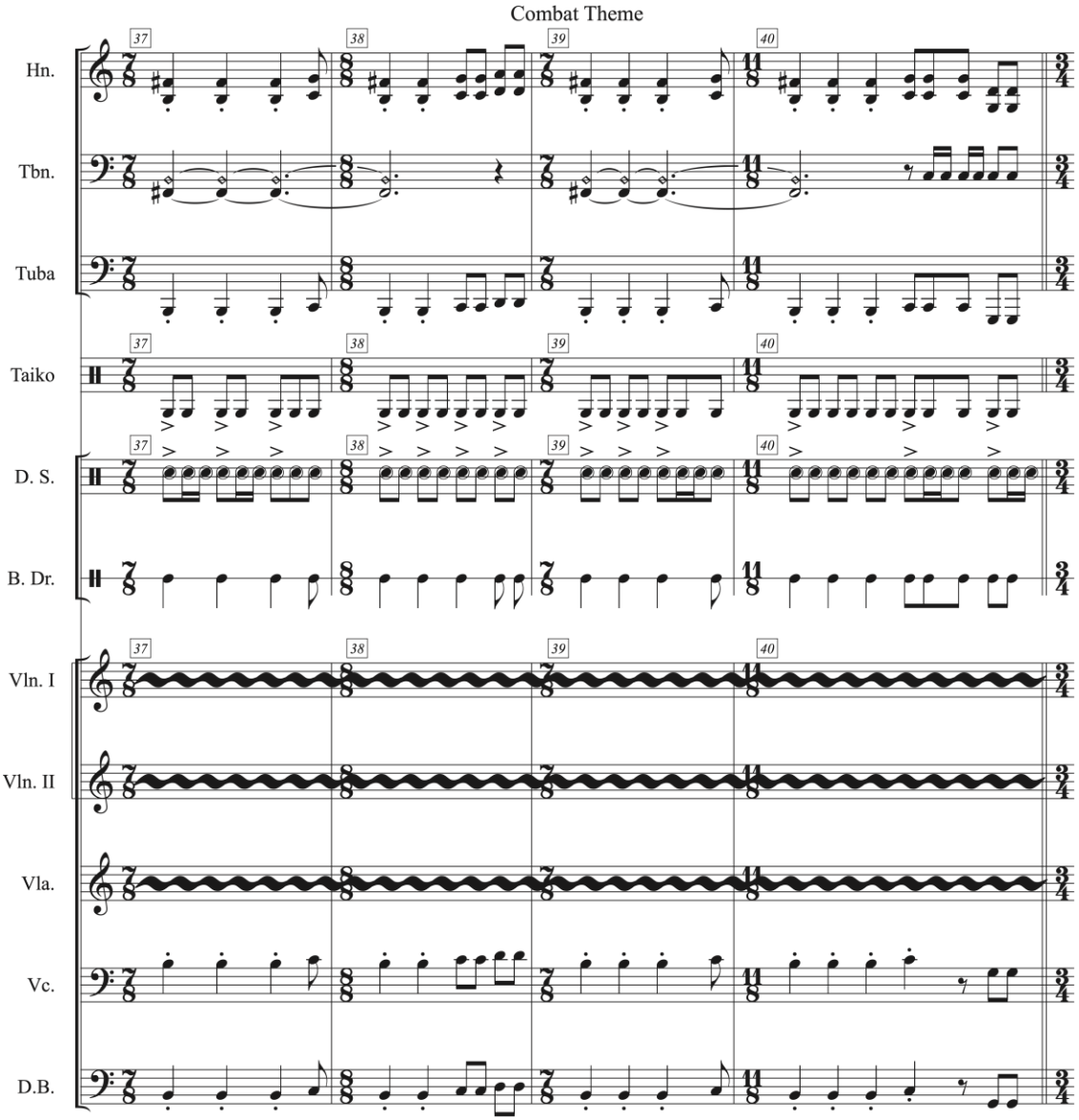

Combat Theme
Hn.
Tbn.
Tuba
Taiko
D. S.
B. Dr.
Vln. I
Vln. II
Vla.
Vc.
D.B.
17
18
19
20
pp
ff

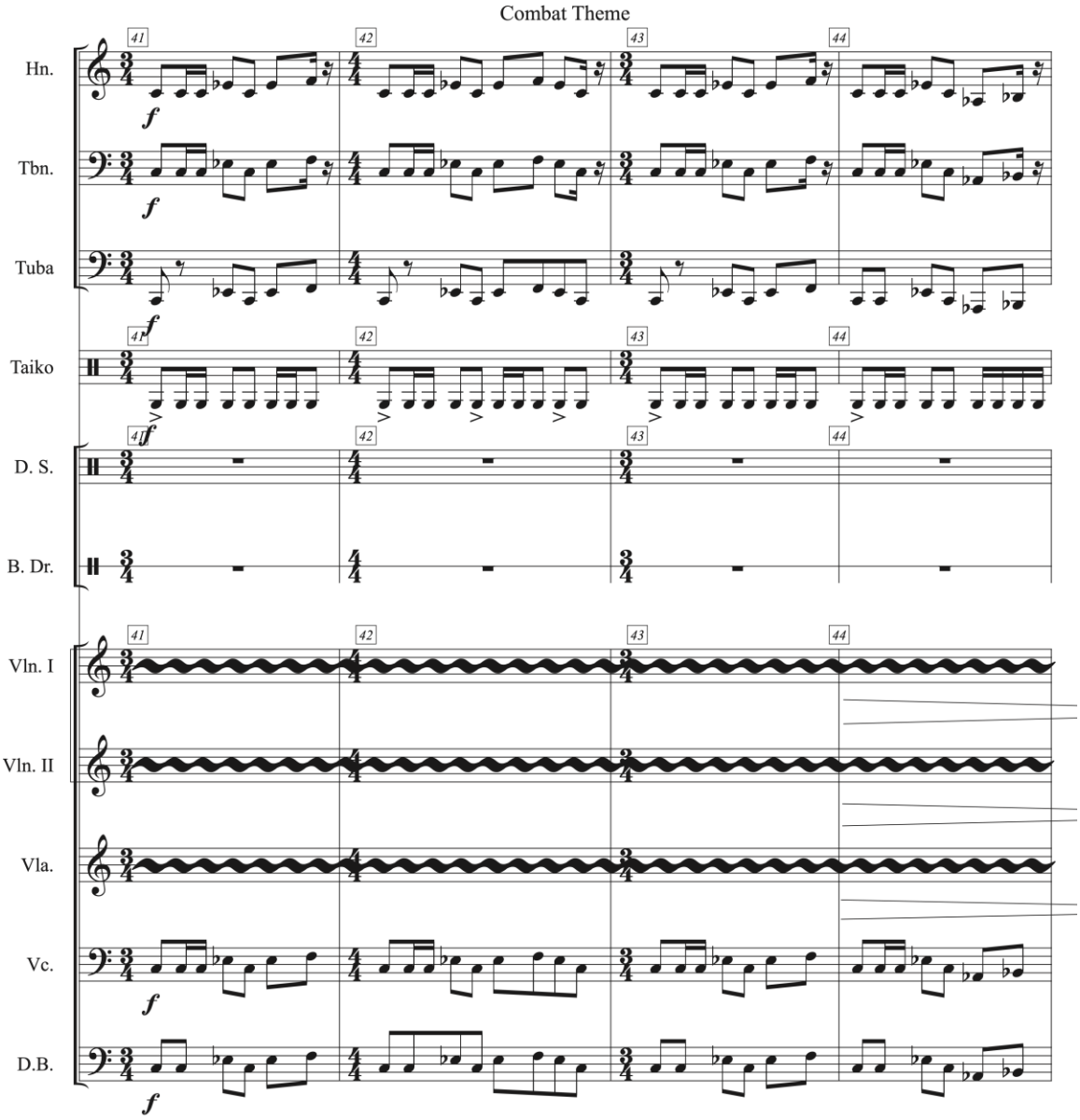

Combat Theme
Hn.
Tbn.
Tuba
Taiko
D. S.
B. Dr.
Vln. I
Vln. II
Vla.
Vc.
D.B.
21
22
23
24

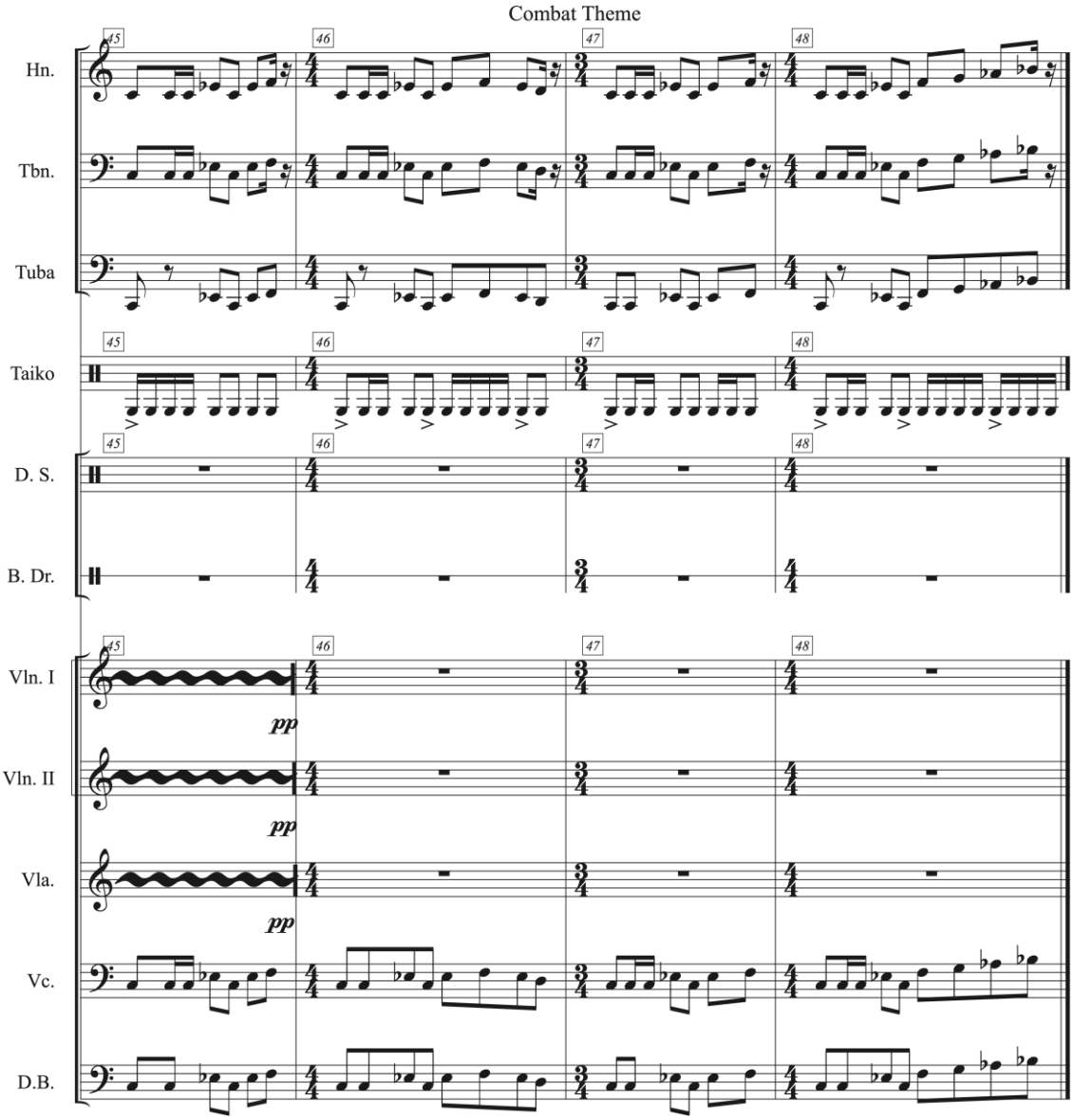

Combat Theme
Hn.
Tbn.
Tuba
Taiko
D. S.
B. Dr.
Vln. I
Vln. II
Vla.
Vc.
D.B.
25
26
27
28
f
ff


Combat Theme
Hn.
Tbn.
Tuba
Taiko
D. S.
B. Dr.
Vln. I
Vln. II
Vla.
Vc.
D.B.
29
30
31
32


Combat Theme
Hn.
Tbn.
Tuba
Taiko
D. S.
B. Dr.
Vln. I
Vln. II
Vla.
Vc.
D.B.
33
34
35
36


Combat Theme
Hn.
Tbn.
Tuba
Taiko
D. S.
B. Dr.
Vln. I
Vln. II
Vla.
Vc.
D.B.
37
38
39
40


Combat Theme
Hn.
Tbn.
Tuba
Taiko
D. S.
B. Dr.
Vln. I
Vln. II
Vla.
Vc.
D.B.
41
42
43
44
f

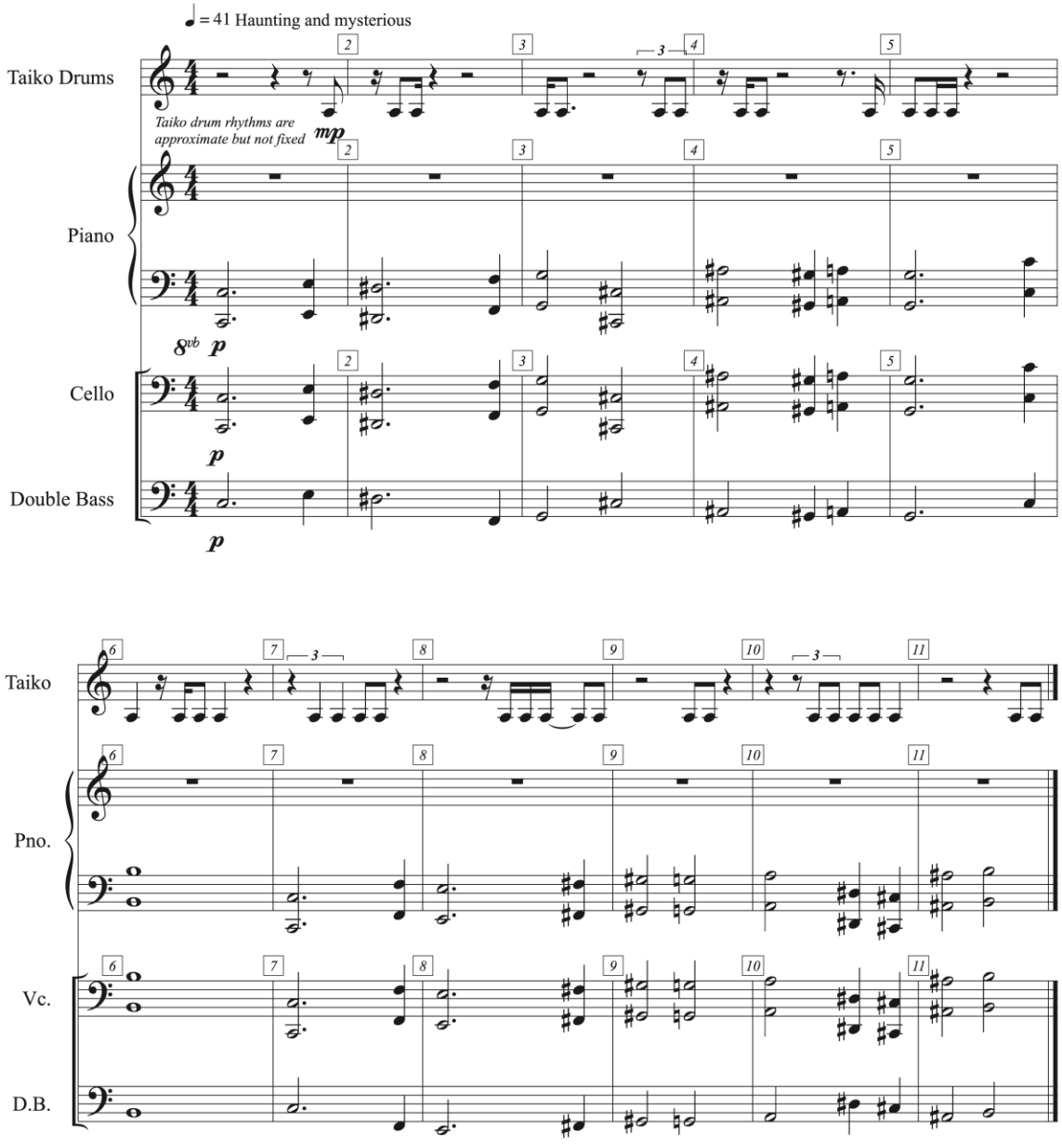

Combat Theme
Hn.
Tbn.
Tuba
Taiko
D. S.
B. Dr.
Vln. I
Vln. II
Vla.
Vc.
D.B.
45
46
47
48
pp

Score

Dungeon Theme

from Escape Beneath

Dan Cooper

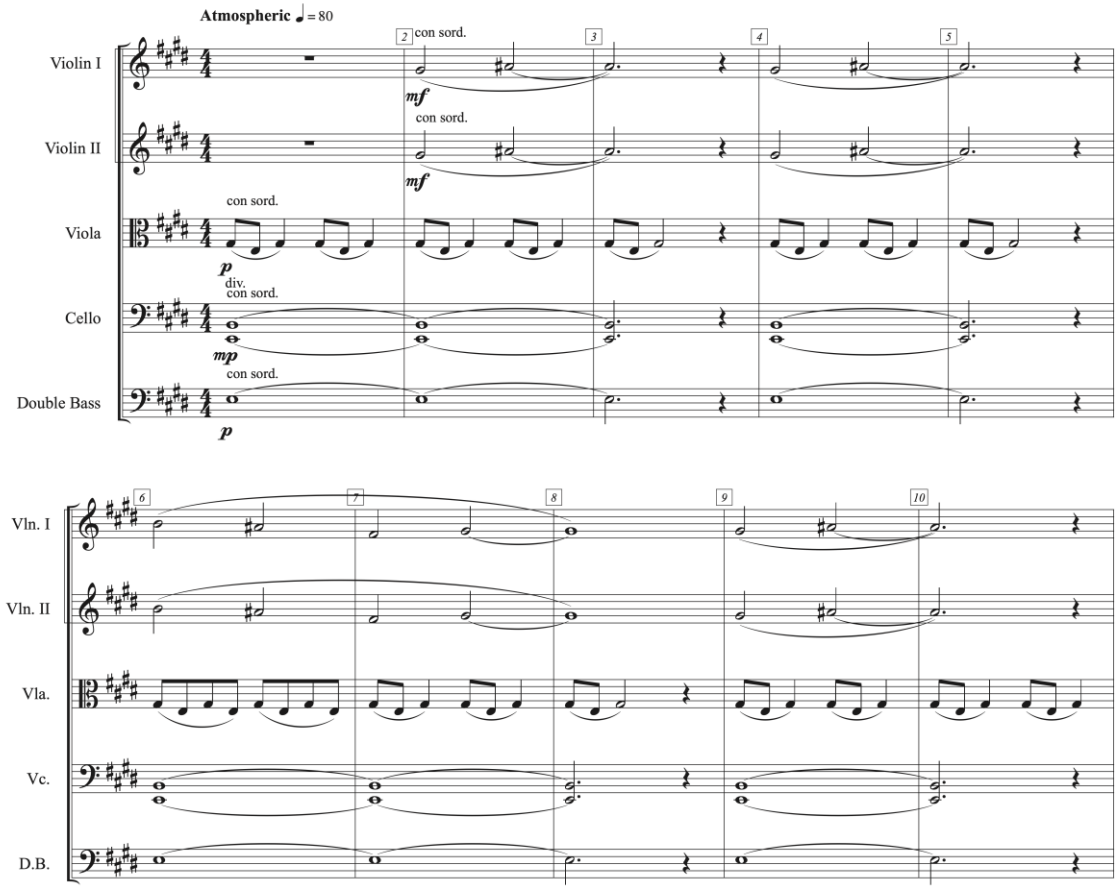


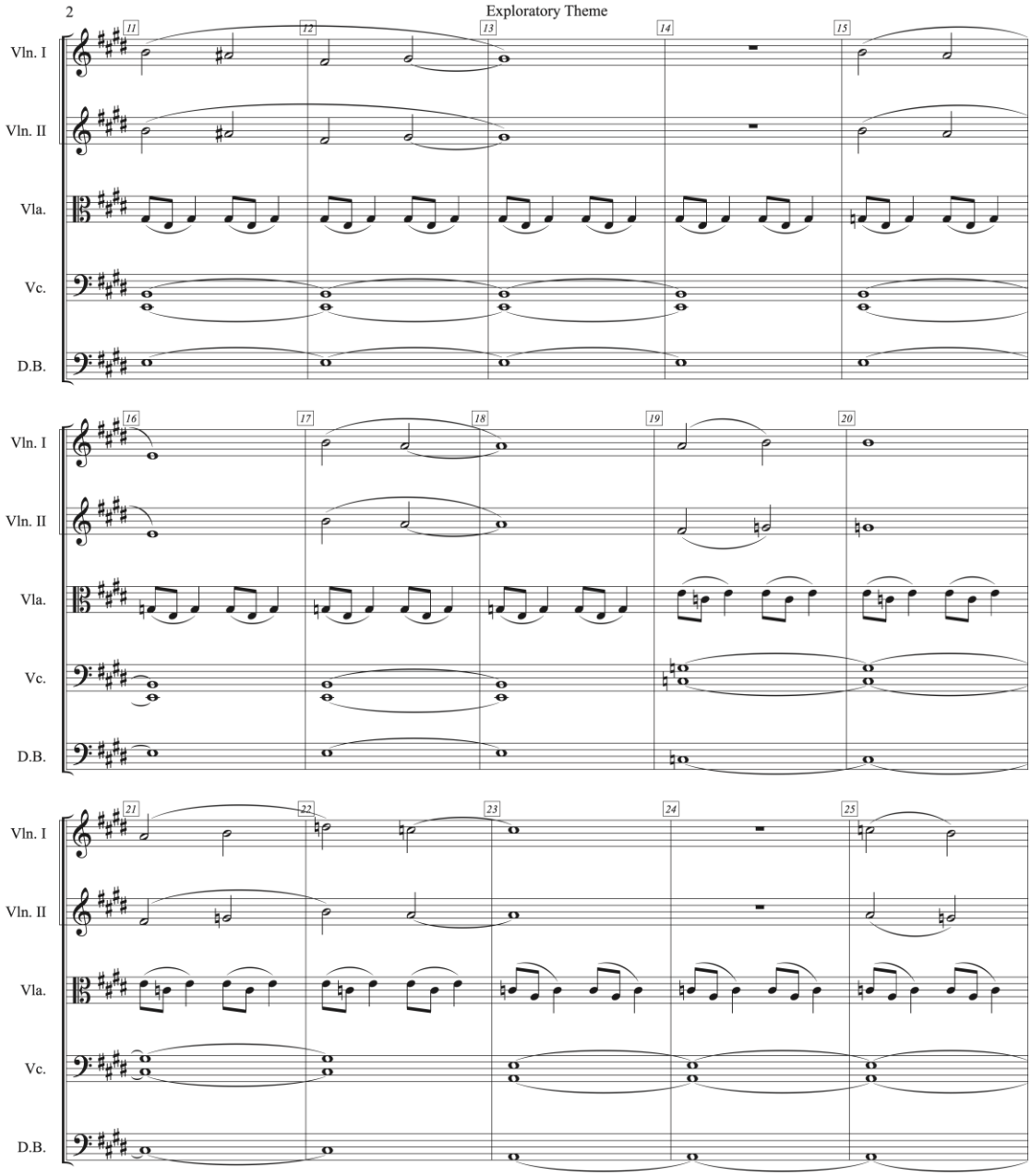
Score

Exploratory Theme

from Escape Beneath

Dan Cooper

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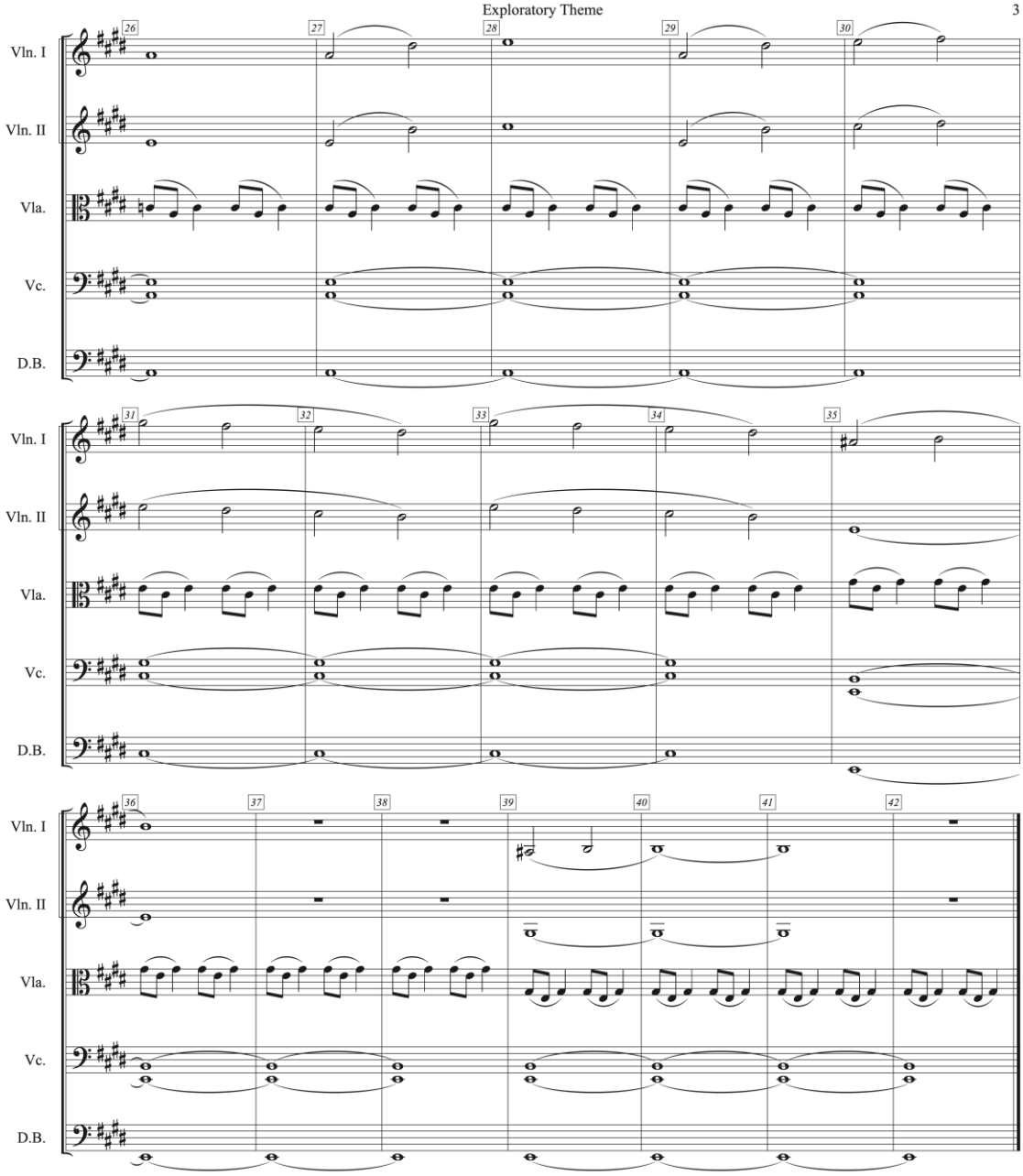
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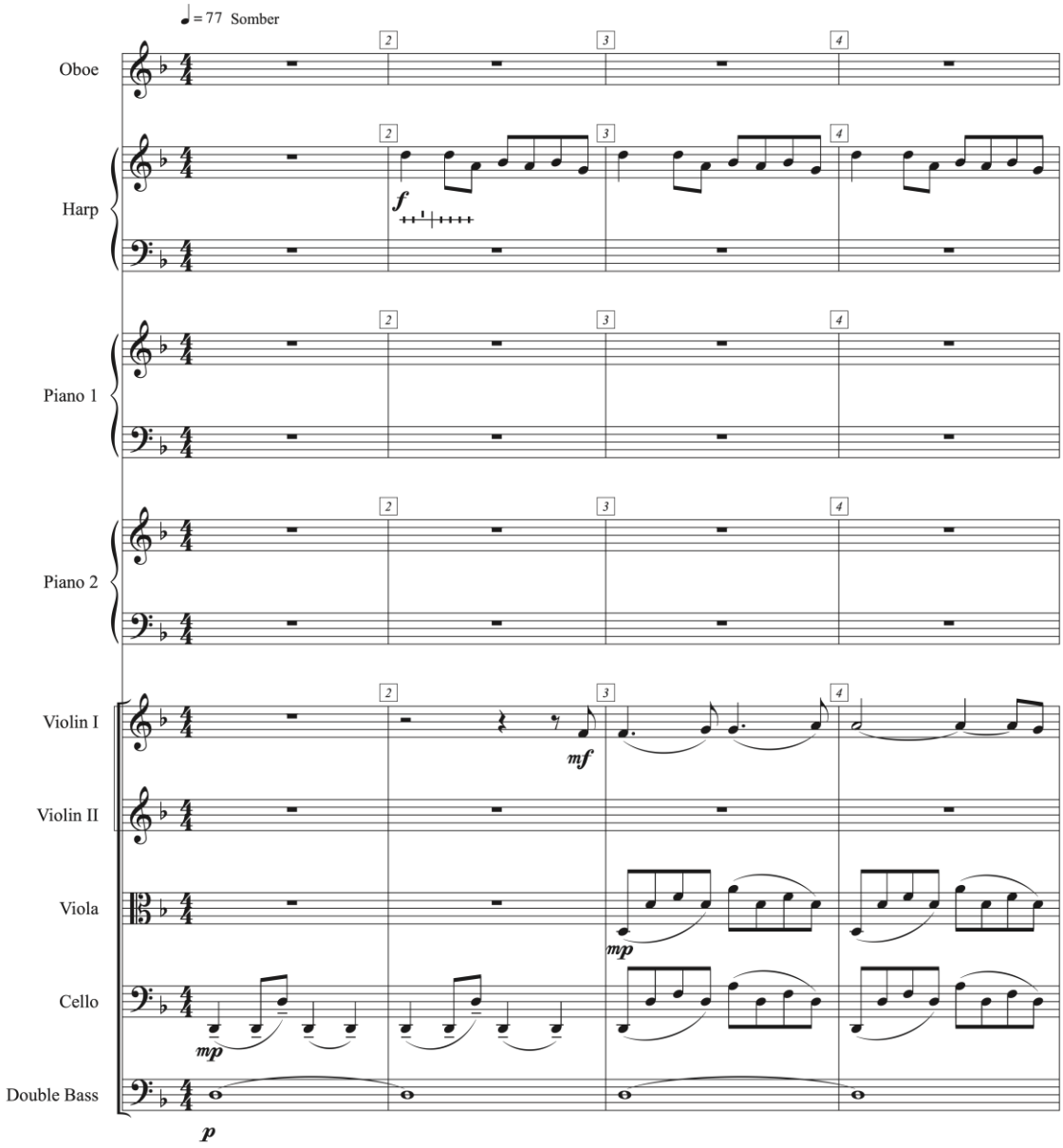
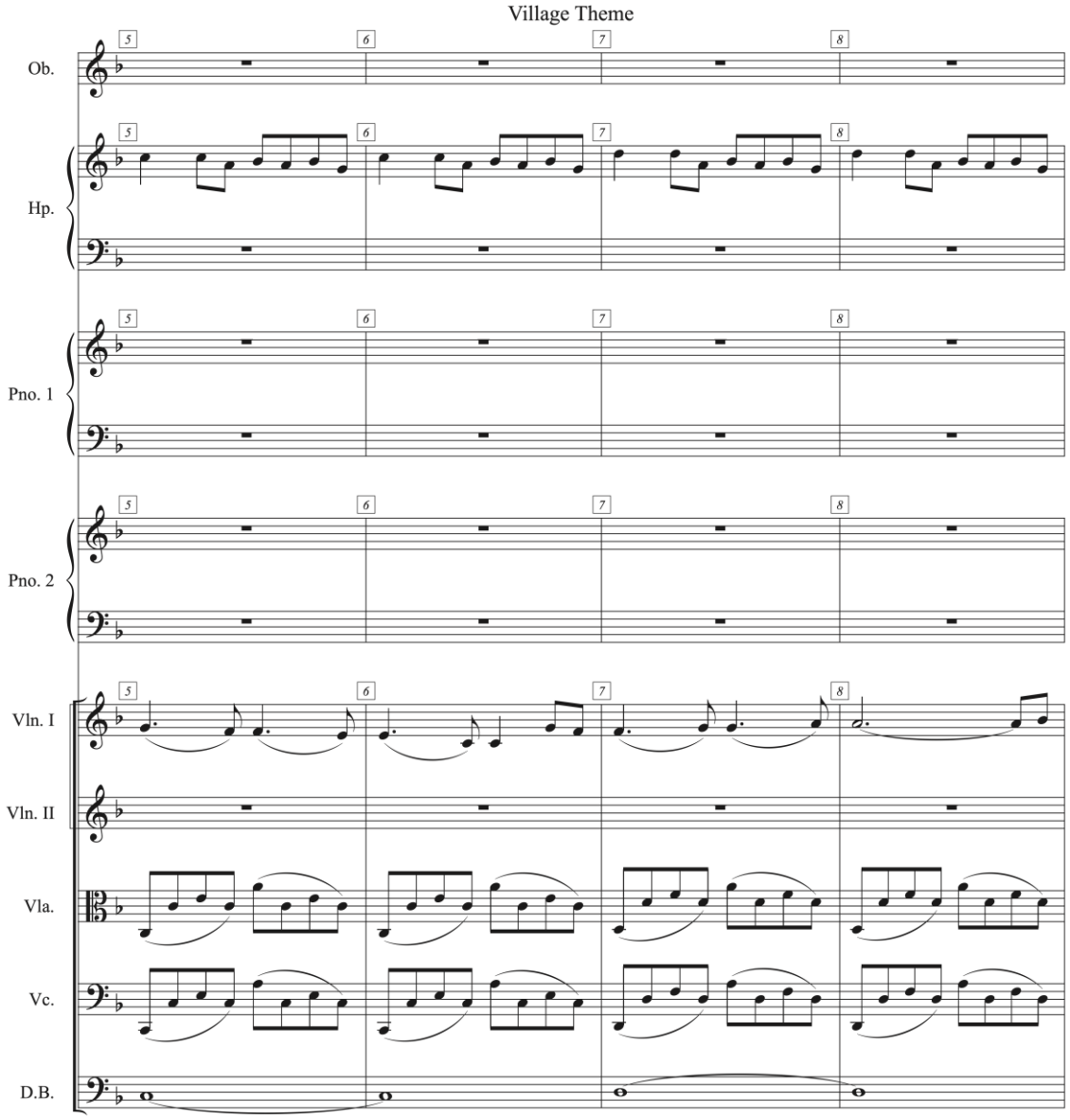
Score

Village Theme

from Escape Beneath

Dan Cooper

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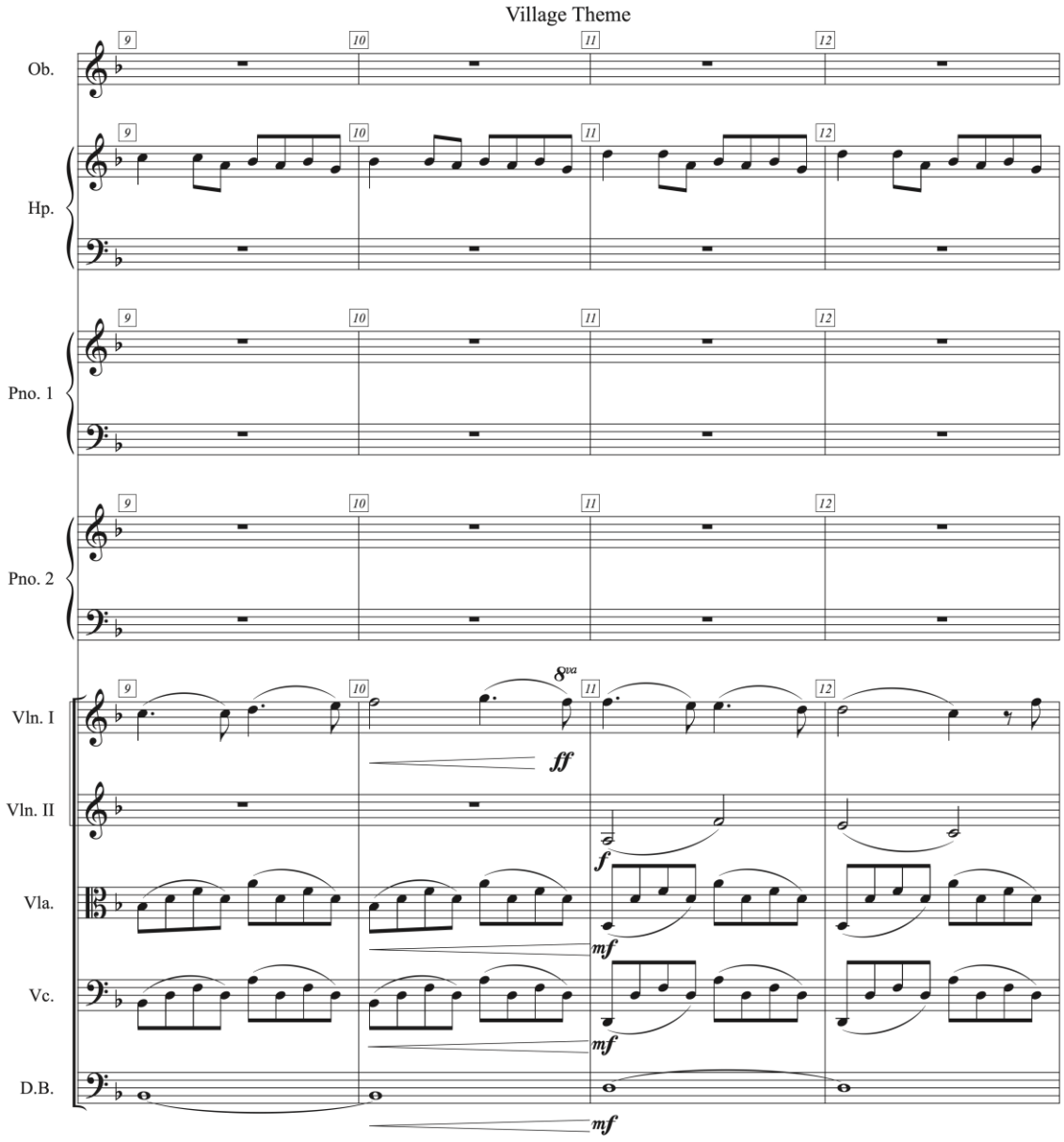
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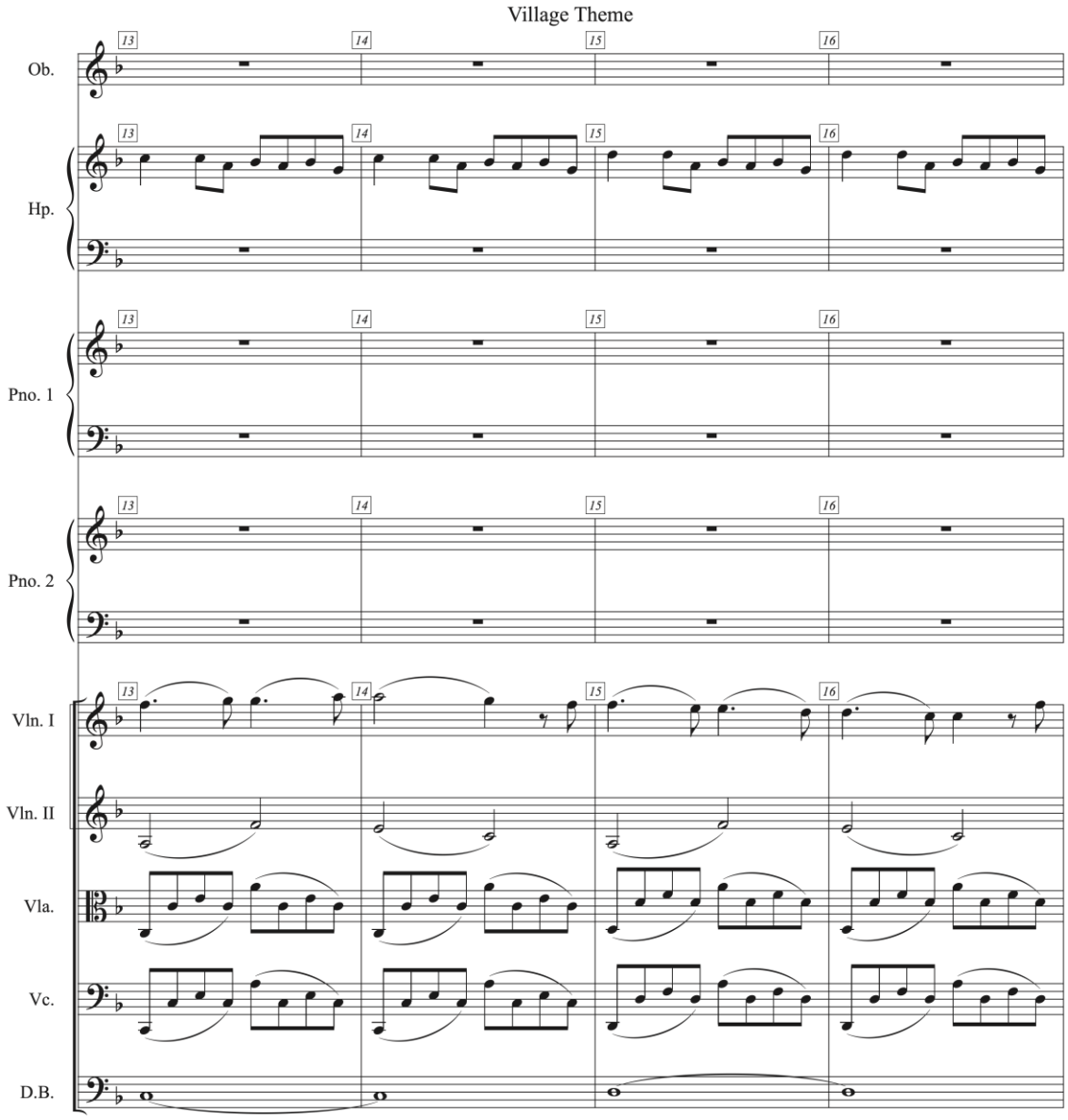
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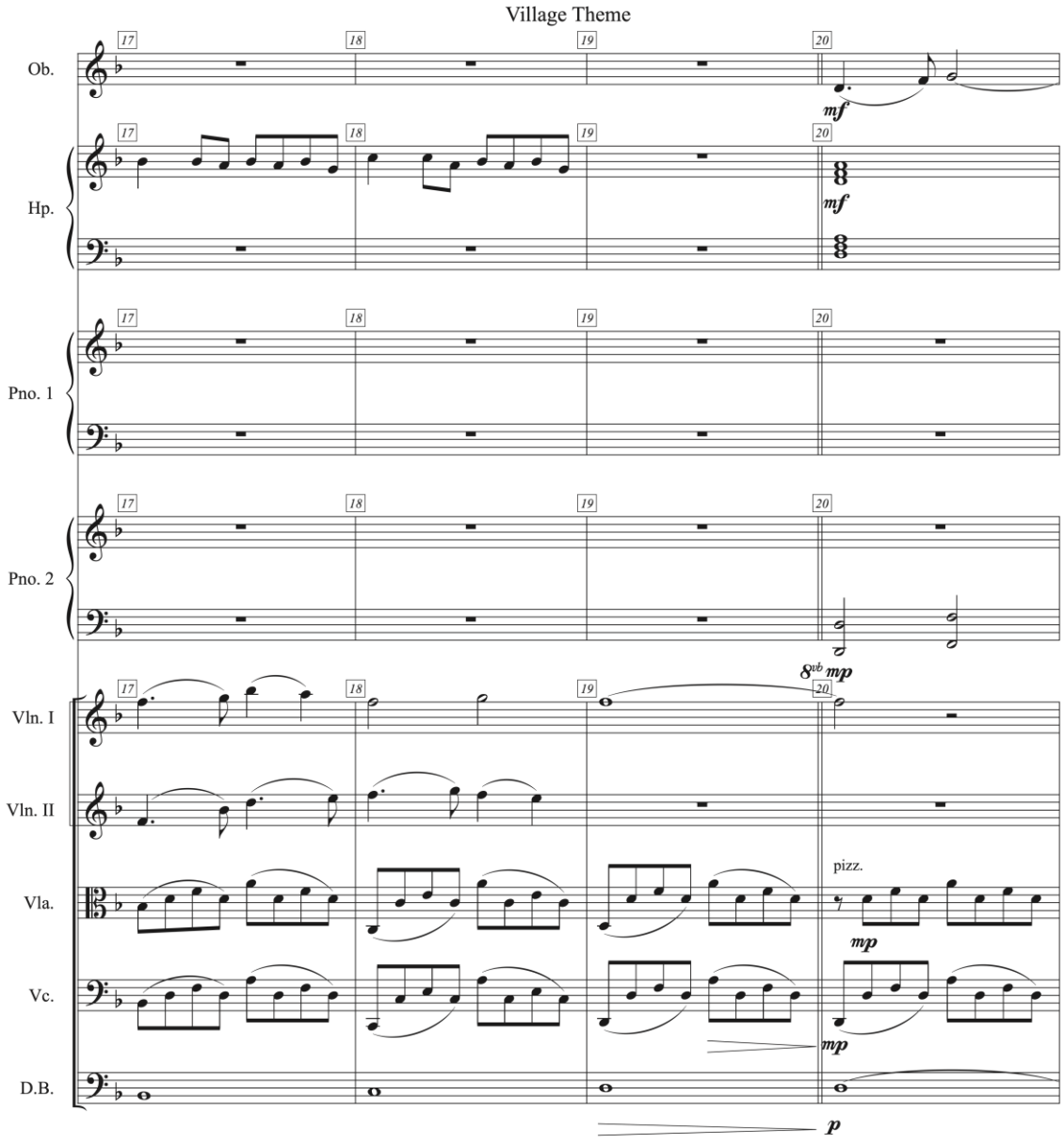
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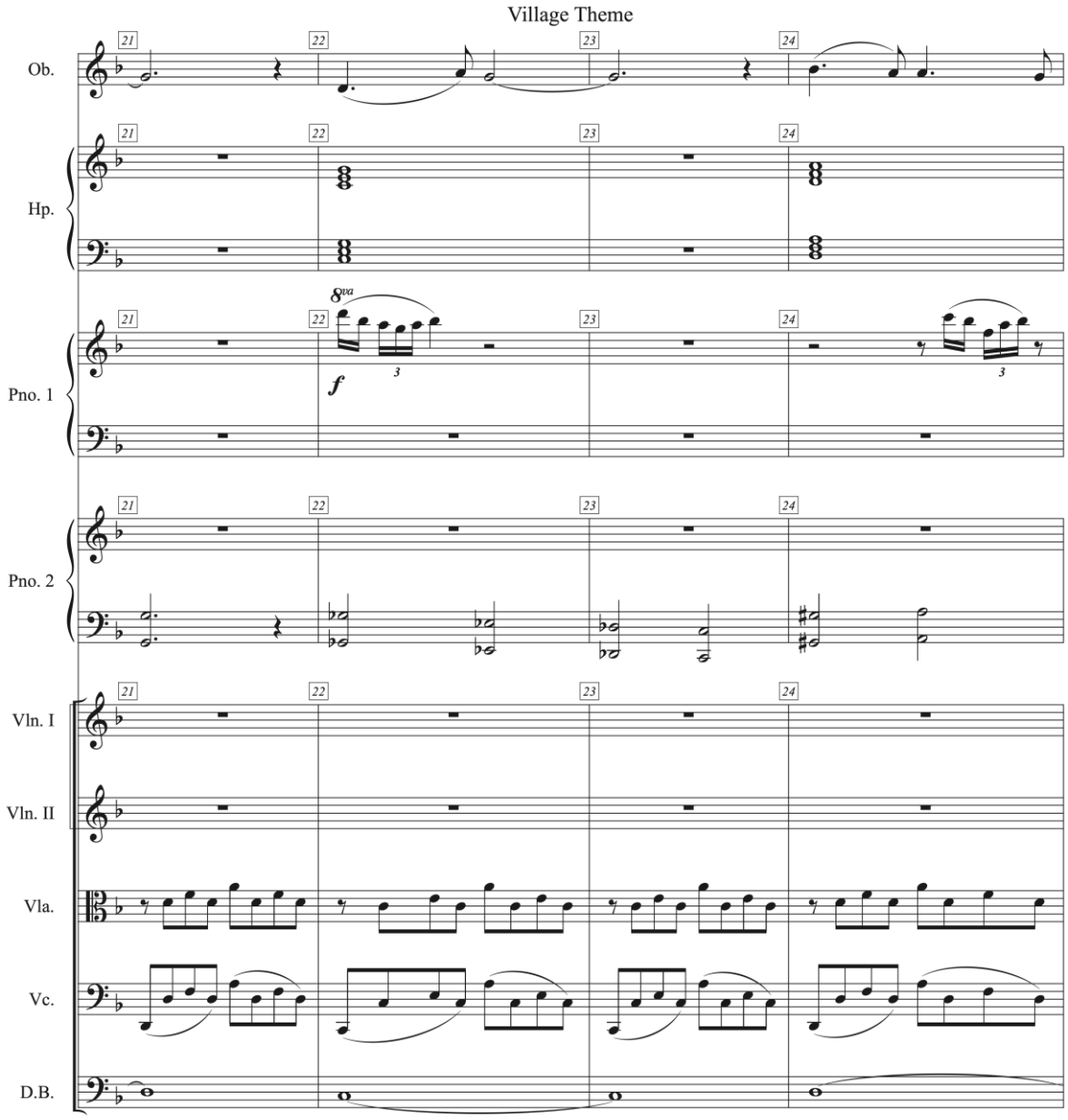
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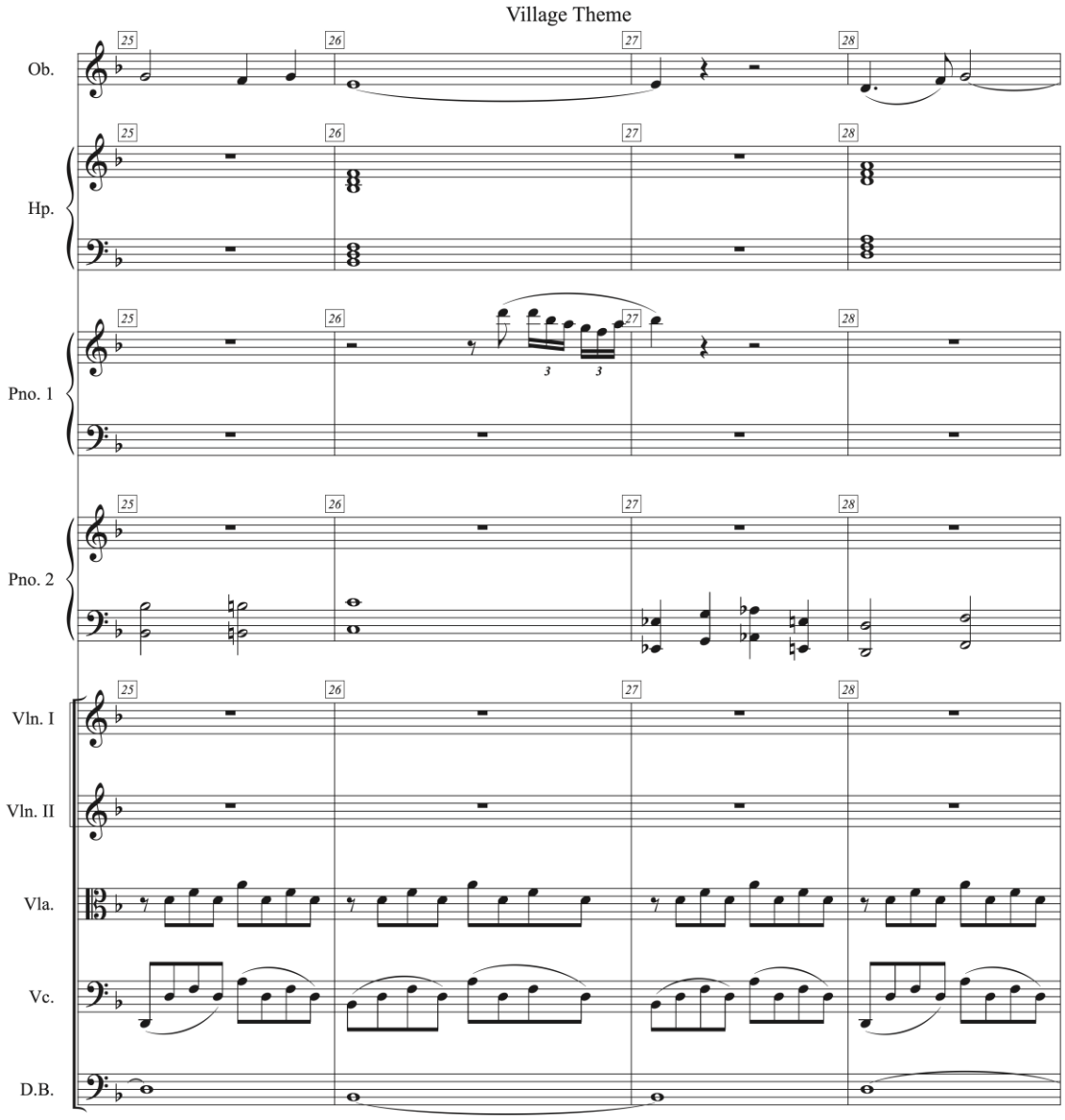
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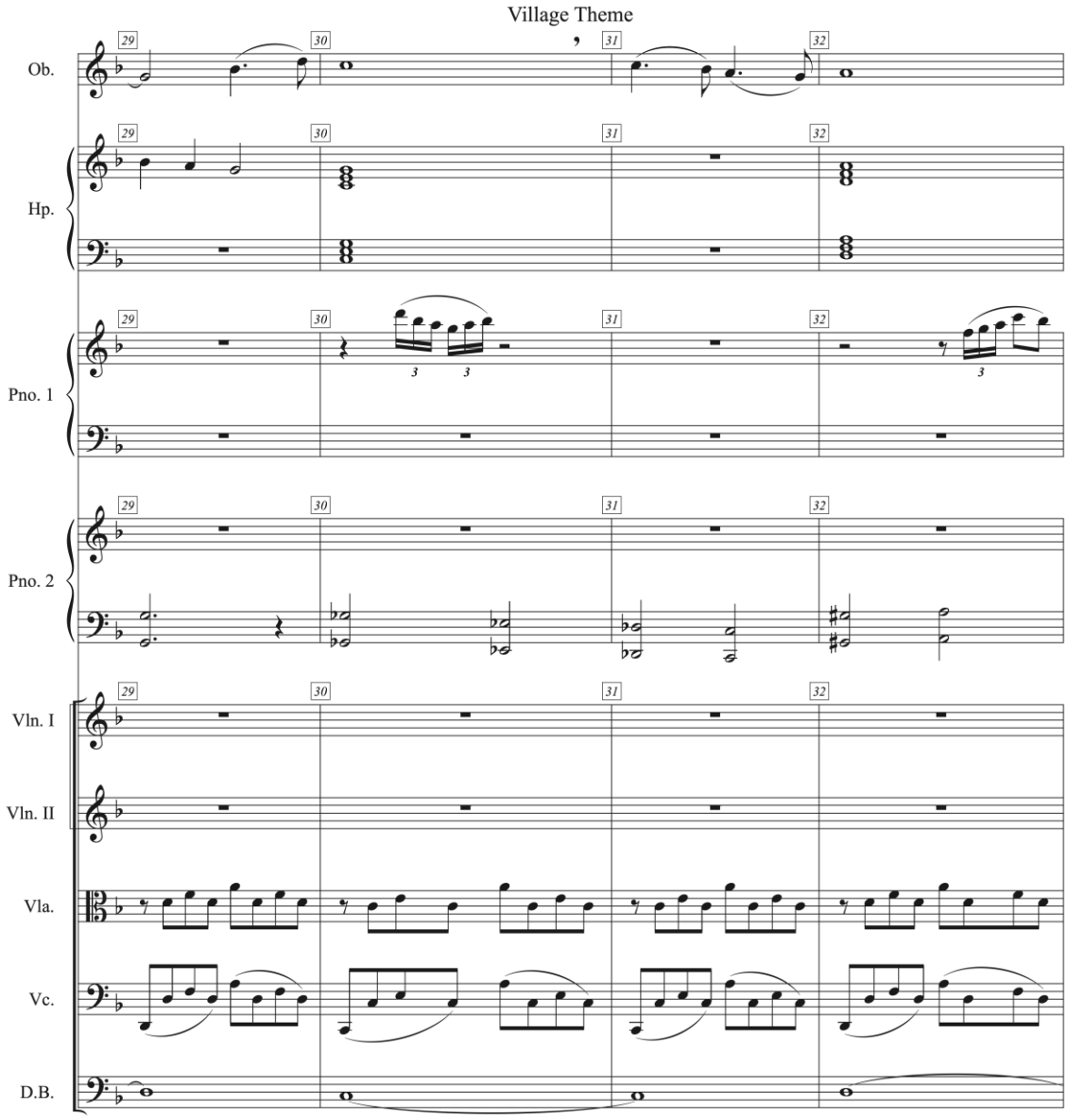
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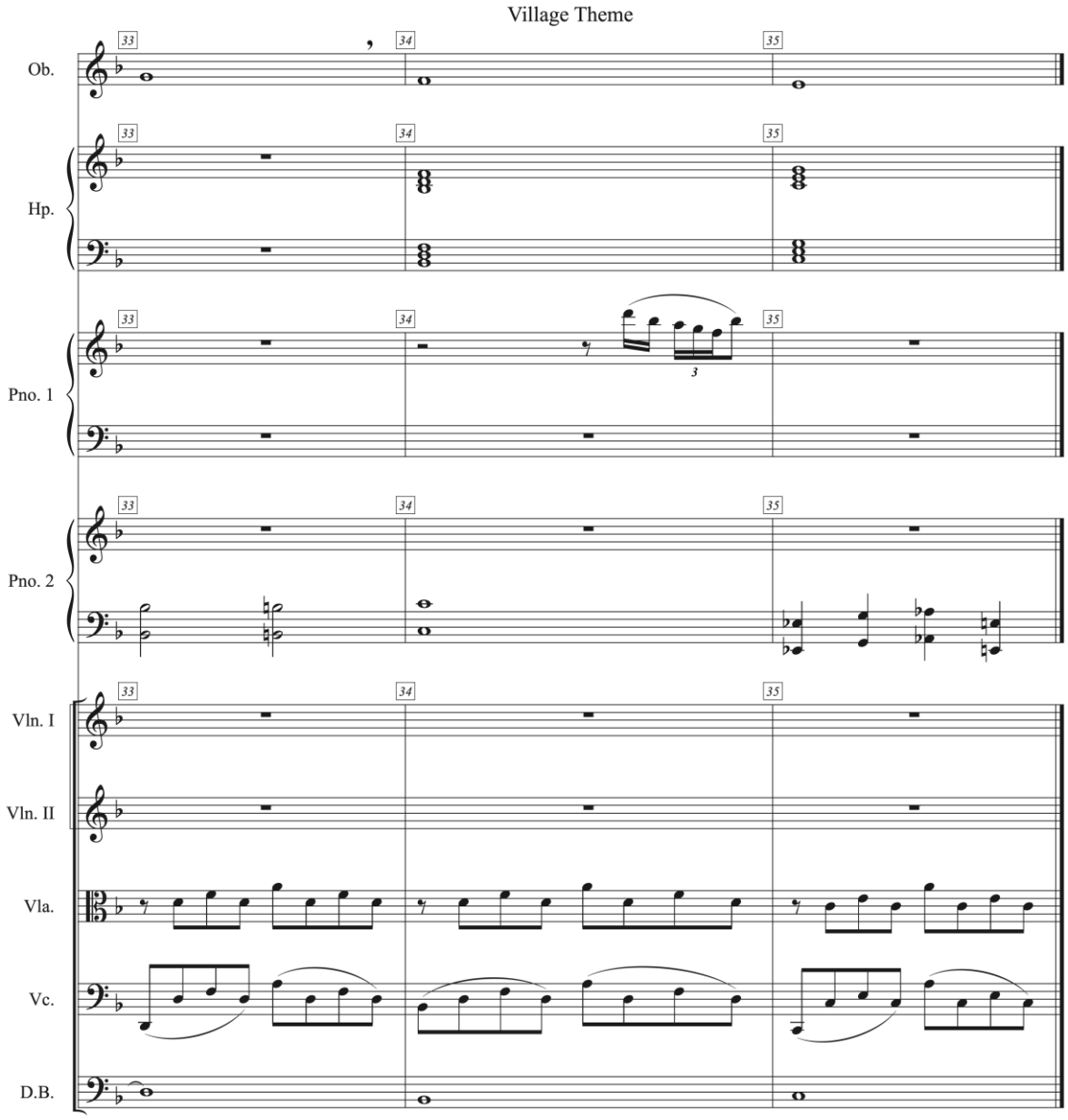
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APPENDIX A – GAME SYNOPSES

I. *BioShock*[31]

In the first *BioShock* game, players are asked what a society would potentially be like if there were "No Gods, No King, Only Man." In 1960, the world is oblivious that there is an underwater "utopia" in the North Atlantic that was founded on this principle. Billionaire Andrew Ryan hired workers in secret to build this dream city (called Rapture) at the bottom of the ocean, away from any source of outside government, aristocratic, moral, or religious influence. It is founded on the principles of a truly free, capitalist market where anyone can succeed in business, scientists can create and study without moral authority, and artists can create without censors.

Players control Jack, who has survived a plane crash over the North Atlantic, right above where Rapture hides. As he escapes the plane crash, he swims to a lone lighthouse to find a bathysphere below a sign that reads "No Gods, No Kings, Only Man." Deciding to climb in, the bathysphere takes Jack to the mysterious city below. When he arrives, Jack is disturbed to find mutated people (called splicers) with supernatural abilities, such as being able to conjure fire and ice with just their hands. In a society with near-unlimited freedom, corruption became rampant instead of peace due to a substance called ADAM.

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31. *BioShock*, directed by Ken Levine (2K Games, 2007), video game.

ADAM was found in a sea slug at the bottom of the ocean, and when harvested and enhanced, it can give people these supernatural abilities. However, ADAM is not harmless. It slowly corrupts the minds of its users. Even more disturbing, it is primarily harvested by children called Little Sisters. Jack teams up with a mysterious person named "Atlas" to fight his way back to the surface while facing threats of splicers and Big Daddies (large, mutated humans in diving gear that are responsible for maintaining the city and protecting the Little Sisters that they are chemically bonded to). Jack must face challenging moral problems while keeping his mind sane around the ADAM. Whatever choices are made will determine how the game ends.

II. *BioShock 2*[32]

In *BioShock's* sequel *BioShock 2*, players return to Rapture eight years after the events of *BioShock*. At this point, Rapture has descended even further into chaos. A religious cult formed around the city's psychologist Sofia Lamb. Players control a Big Daddy, named Subject Delta who is trying to find a Little Sister that he was bonded to. This is no easy feat since his Little Sister is Eleanor Lamb, Sophia's daughter. Eight more years of chaos has empowered the threats and evil in Rapture even more. Delta must find Eleanor, potentially rescue the remaining Little Sisters, and flee Rapture. Similar to

32. *BioShock 2*, directed by Jordon Thomas (2K Games, 2010), video game.

BioShock, players will make challenging decisions based on their own moral principles. Their choices will determine the game's ending and the degree of corruption will happen.

III. *BioShock Infinite*[33]

BioShock Infinite revolves around the protagonists Booker DeWitt and Elizabeth within the fictional, floating-city of Columbia. Booker is a former soldier and Pinkerton agent who is hired by a mysterious person for a job. Booker has accrued a large gambling debt, which the stranger promises to wipe away if he brings them the girl from Columbia (Elizabeth). In the beginning (and before Booker and the player know where Columbia is and what it is), Booker must traverse a raging sea in a row boat to reach a lighthouse; however, the lighthouse is anything but welcoming. As Booker climbs to the top of the lighthouse, he is disturbed to find a dead body and a message written in blood. Once he finally reaches the top, he is surprised to find that the top of the lighthouse is actually a capsule which rockets him into the sky. As he bursts through the storm clouds, Booker sees the city of Columbia floating in the sky. The city hovers above the clouds, in a seemingly serene environment. Columbia is meant to be the exaggerated representation of white, American exceptionalism. In Columbia, the Founding Fathers George Washington, Benjamin Franklin, and Thomas Jefferson are worshipped and prayed to as

33. *Bioshock Infinite*, directed by Ken Levine, (2k Games, 2013), video game.

gods, racism is rampant, Abraham Lincoln is viewed as an apostate while John Wilkes Booth is a savior. All of this makes Booker skeptical of Columbia. He comes to find that this city is led by a man called "The Prophet," Zachary Hale Comstock. Comstock preaches the word of their Founding Fathers while warning that a "deceiver" with the initials A.D. marked on his hand will arrive one day; a mark that Booker just so happens to have on his hand. Not all is as it seems in the calm environment of Columbia. Booker finds Elizabeth, who him on his journey as a helpful NPC; but then they must fight their way through Columbia while discovering the dangers and secrets that the city holds. As they traverse Columbia, they find that not all is as it seems with Booker, Elizabeth, and Comstock; and the city falls into chaos.

IV. *Middle Earth, Shadow of War*[34]

Middle-Earth: Shadow of War is based on J.R.R. Tolkien's *The Hobbit* and *The Lord of the Rings* legendarium.[35] Although a separate story from *The Hobbit* and *The Lord of the Rings*, *Shadow of War* takes place in between the two stories and is a direct-

34. *Middle-Earth: Shadow of War*, directed by Mike de Plater (Warner Bros. Interactive Entertainment, 2017), video game.

35. John Ronald Reuel Tolkien, *The Hobbit: Or There and Back Again* (New York, NY: Del Rey, 1937); John Ronald Reuel Tolkien, *The Lord of the Rings: Fellowship of the Ring* (Boston, MA: Mariner Books/Houghton Mifflin Harcourt, 1954); John Ronald Reuel Tolkien, *The Lord of the Rings: The Two Towers* (Boston, MA: Mariner Books/Houghton Mifflin Harcourt, 1954); John Ronald Reuel Tolkien, *The Lord of the Rings: The Return of the King* (Boston, MA: Mariner Books, Houghton Mifflin Harcourt, 1955).

sequel to the game *Middle-Earth: Shadow of Mordor*. Fans of J. R. R. Tolkien's series will find many of its most famous characters in both games such as Sauron, Galadriel, Shelob, and more. In *Shadow of War*, the human protagonist Talion is infused with the spirit Celebrimbor, an elf lord and ring-maker. In the land of Mordor and in the fire of Mount Doom, Talion/Celebrimbor create a new ring of power, free from the influence of Sauron (the primary antagonist of *The Lord of the Rings* series). When the ring is completed, a force rips Celebrimbor's spirit out of Talion and holds him hostage. Talion must find and free Celebrimbor. Once reunited, Talion and Celebrimbor use this new ring of power to combat the forces and armies of Sauron. Although they are initially successful in battle, more forces of darkness seek the ring and corruption.

V. *Torn*[36]

Torn combines both fantasy and science fiction elements to take gamers on an incredible journey through the eyes of the protagonist Katherine Patterson. Katherine stumbles upon a seemingly abandoned mansion in the woods. Despite its forest environment, this mansion contains many strange machines, gadgets, and experiments. Katherine soon discovers that this is the home of Dr. Lawrence Talbot and his wife, both of whom suddenly vanished over sixty years ago.

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36. *Torn*, written by Neill Glancy and Susan O'Connor (Aspyr Media, 2018), video game.

While exploring the grounds, Katherine finds that Dr. Lawrence is still alive but is missing his memories and is stuck in a different dimension. Although missing his body and appearing as a form of light from the other dimension, Dr. Lawrence guides Katherine in reactivating his machines, exploring the mansion, rekindling his memories, finding his wife, and understanding the dimension that he has been living in called "The Parallel."

VI. *Escape Beneath*

Escape Beneath is a new game in development with Dread Vector studios. Escape Beneath is a virtual realty game for the Oculus system and PC. It is also the game for which the original score of this thesis has been composed. While the game is still in development at the time of this thesis, the current synopsis is that in a small village, four guilds exist: fighters, clerics, rangers, and wizards. In the lower planes outside of the village, rifts begin to open across the land, spilling armies of the dead into the world. Villages fall to the undead horde. The heroes of the game must traverse the world, seeking answers to why the rifts were opening and then eventually fighting the boss of the demiplane (the most ill-stricken area of the game).

APPENDIX B - GLOSSARY

Adaptive Music: Music that changes in real time based on the players action. For example, adding additional score layers, changes in tempo and rhythm, musical form, or any other musical device.

Audio Middleware: Software that works with the game engine to allow for greater audio control, features, and space. WWise and FMOD are examples of audio middleware.[37]

DAW: Digital Audio Workstation. Recording and composing software.

Dungeon Crawler: A video game that requires exploring and battling through a labyrinth environment.

Game Engine: The design and operating platform of a video game, such as Unreal Engine, Unity, and Frostbite.

Gameplay: The active time that the player is playing the game (as opposed to an in-game movie/cutscene).

Game State: Any primary event or situation within a video game. For example, exploring the woods can be a game state but if an enemy appears and combat

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37. Audiokinetic Incorporated, "Wwise," Audiokinetic.com, accessed November 2, 2022, https://www.audiokinetic.com/en/products/wwise/; Firelight Technologies Pty Ltd, "FMOD Studio," Fmod.com, accessed November 2, 2022, https://www.fmod.com/studio.

ensues, the game state has changed since the situation has moved from exploratory to combat.

NPC: Non-Playable Character. Characters within a video game that you can interact with but not control.

Playable Character: Any character within a video game that is controllable. Some games may only have one playable character while other games may have an abundance of playable characters.

Quantize: Digitally correcting recorded imperfections (most frequently rhythms) within a DAW.

Stinger: A short musical cue or sound effect that often indicates that the game state has been changed. Stingers can be used as indicators of a transition.

VR: Virtual Reality. Games that are more immersive due to a headset and controllers that put the player directly into the game itself

VITA

Daniel Cooper began his college career in 2009 in Rochester, New York at Roberts Wesleyan University (then Roberts Wesleyan College) as a music performance major with a concentration in guitar. Halfway through his RWU education, he decided to blend his love of music with his love of art by becoming a dual major in music and studio art (with an art concentration of interactive design and media). This dual degree allowed him to begin building the connection between music and media. As an avid gamer and film enthusiast, he has sought to combine his love for music, gaming, and film by studying music composition within games and films. Always a songwriter and arranger, he began studing music compositon during undergrad with Dr. Daniel Barta and Dr. Russell Scarbrough. After graduating, Daniel continued to compose while also focusing on performing and teaching. In 2019, he reentered the academic world to pursue a Master of Music degree in Theory and Composition at Stephen F. Austin State University in Nacodoches, Texas, studing music composition with Dr. Stephen Lias and video-game composition with Mr. Mason Lieberman and Mr. Vincent Diamante.

The style guide for this document was *A Manual for Writers of Research Papers, Theses, and Dissertations* by Kate L. Turabian (9th Edition).

This thesis was typed by Daniel L. Cooper