

University of West London

London College of Music

MMus Composition for Film and TV

Project

Authenticity in Medieval Game Music: music composition for interactive game worlds

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Project Link:

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Abstract

This project explored the possibility to compose historically authentic medieval music for video games about the Middle Ages and compared it with two other options - non-authentic “medieval” music and a soundtrack with some authentic medieval music elements in it. As it was shown in A1, modern composers prefer a Hollywood-style orchestral sound which utilises some basic elements of medieval music over authenticity in video games based on the Middle Ages period. This project aimed to illustrate that authenticity in Medieval Game Music is possible and should be considered by modern composers as one of the ways to produce music for a video game set in the Middle Ages that is on a par in its effectiveness with both non-authentic music and music with a limited number of authentic medieval musical elements. To show this autoethnographic research was conducted as well as further reading. Three tracks were created with three varying levels of authenticity and implemented into the Viking Village asset through Unity and FMOD.

Contents

Contents	3
1. Introduction	4
2. Further Literature	5
2.1 Overview	5
2.2 Compositional Techniques of Authentic Medieval Music	5
2.3 Musical Features of Soundtracks in Video Games about the Middle Ages	8
2.4 Ways of Implementing Music with FMOD and Unity	10
3. Methodology	12
4. Results & Discussion	12
4.1 Overview	12
4.2 First Level Authenticity, or Artefact 1 (non-authentic)	13
4.3 Second Level Authenticity, or Artefact 2 (less authentic)	18
4.4 Third Level Authenticity, or Artefact 3 (authentic)	24
5. Conclusion	29
6. References	30
7. Appendix	32

1. Introduction

The main purpose of this project is to show that it is possible to achieve authenticity in medieval game music and illustrate it with three tracks: authentic medieval music, non-authentic “medieval” music and a track with medieval compositional features. Many game composers in their interviews (as it will be shown further on in the paper) claim that music used in movies, shows and games about the Middle Ages is not authentic but they try to implement some elements which suggest a historical aesthetic. So, they try to achieve the “medieval authenticity effect” by relying on the human perception of this period.

As discussed in A1, this phenomenon is called “medievalism”. Medievalism can also stand for the lack of authenticity in anything based on the Middle Ages time. Music of the video game “The Witcher 3: Wild Hunt”, the show “The Witcher” by Netflix (both are based on the book series “The Witcher”), the video game “Kingdom Come: Deliverance”, the video game Elder Scrolls V: Skyrim, and the movie “The Green Knight” was analysed in A1, and as a result, it was proven that composers preferred to use medieval musical instruments without exploring the Middle Ages music compositional techniques.

This project shows the possibility of using different approaches in writing music for a game set up in the Middle Ages, including producing the medieval-stylised track with the features of early music. The autoethnography research method helps to capture every step of practical work. Moreover, such artefacts as music scores, audio files, FMOD projects, videos, and game applications with finished music help to explore the game music writing process from the beginning to the end.

2. Further Literature

2.1 Overview

The main topic of this research is the authenticity of medieval-themed game music. As it was shown in A1, nowadays, film and game composers rely more on their perception of the Middle Ages than on actual historical examples of the music, rules and compositional techniques of that time. This paper continues to explore the possibility of writing and using an authentic medieval-styled soundtrack. Further reading on this topic provides useful information needed to complete the practical part of the project. If the A1 paper focused on evidence of music for the Middle Ages film or game set is not authentic, the A2 paper considers the topic in more detail.

2.2 Compositional Techniques of Authentic Medieval Music

About a thousand years ago music in Western Europe became a partly literate one, instead of being an oral tradition only (Taruskin, 2005). This start of music notation gives a chance to musicians nowadays to reveal some features and compositional techniques of medieval music. As for composers who need or wish to write authentic medieval-styled music for their projects, it is important to start with understanding the idea of the music in the Medieval period.

As Cyril Scott writes in his book, “Whereas Melody is the cry of Man to God, Harmony is the answer of God to Man” (Scott, 1933). Indeed, people of the Middle Ages considered music to be one of God’s inventions and they adapted this invention to serve them in different aspects of life. That is why medieval music can be divided into religious (liturgical) and secular, or non-religious music (Taruskin, 2005). The Medieval historic period is wide and goes from the 5th to the late 15th century, and this dissertation considers both sacred and secular music compositional techniques but does not consider music which is not documented in musical notation.

Instrumentation

Medieval music was not written with a particular instrument in mind. Even a piece with a single line in it could be played on instruments capable of the second line of musical accompaniment, such as harps and gitterns. Various medieval paintings capture that secular music was usually performed by one musician. However, there are still some examples where non-religious music was played by a small group of performers (Pittaway, 2018).

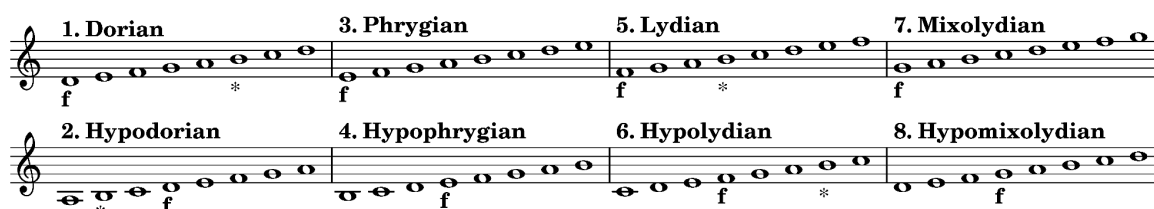
Throughout this historic era, single instruments were separated into different sizes of the same family, allowing an ensemble to utilise a greater range of pitches in a composition. Other instruments, such as horns, trumpets, tabor pipes, psalteries, and hurdy-gurdies were either used more in ceremonial and folk music or were used little until the 17th or the 18th century. Lewis Jones writes in his article “Surviving instruments” that it is difficult to achieve perfect authenticity in medieval sound in modern musical reproductions because preserved instruments from that period are too fragile to be played, and modern replicas might differ in their exact tuning from today’s A = 440hz. (Fallows, Knighton, 1992).

In his work, Pittaway writes that medieval instruments can be divided into two categories, loud for outside and soft for inside. An example of the first group might be the shawm (the loud predecessor of the oboe), the long trumpet (valveless, with its decorative pommels and bosses), and nakers (the small kettledrums usually hung around the waist and usually played in pairs). Some musicologists think that these two groups could not be mixed because the loud ones would overpower the sound of the soft ones but, according to the images from the Middle Ages, these instruments were in fact used together (Pittaway, 2018). Religious music was performed by the choir (voice) and/or the organ. Music was based on an oral, and/or improvised tradition (Fallows, Knighton, 1992).

Musical Textures and Harmony

The fundamental difference between medieval and modern harmony is that early music is not chordal, meaning there is no implication of polyphonic harmonic structure that would be recognisable today based on major and minor triads. Vertical chords were not in use until the late 15th century. However, medieval music still can be understood in retrospect using the concept of polyphony. But instead of being shown by chords, it should be presented by intervals with emphasis on consonants and dissonant. Hendrik van der Werf in his essay “Early Western polyphony” writes that a note at the beginning and the end of the piece had to be accompanied by a stable, perfectly consonant note which, in medieval terms, meant an octave, a unison, a fifth or a lower fifth (a fourth). In between the beginning and the resolving end, any intervals could be possible, even dissonant sevenths and seconds (Fallows, Knighton, 1992).

However, the intervals in the middle of the piece still should be framed with a mode the piece was written to. Nowadays musicians think in keys, not in modes, but back in time keys were not a concept that was used in the same way. Liane Curtis in her essay “Mode” writes that the concept of modes evokes specific emotions and responses. Thus, the authentic modes (Dorian, Phrygian, Lydian, and Mixolydian) were known as cheerful and bright, while plagal modes (Hypodorian, Hypophrygian, Hypolydian, Hypomixolydian) were dark and sombre (Fallows, Knighton, 1992). Aeolian and Ionian (the natural minor and major scales) modes were added to the original eight Gregorian modes (“church modes”) later.



* Under certain conditions, the B is flattened in modes 1, 2, 5, and 6.

Fig. 1 Modes in the Middle Ages

The basic principle of medieval polyphony: voices joining together with a certain degree of independence (although being in the same mode), beginning and ending with a resolution. The horizontal line for the piece could be described in this way: resolution–tension–resolution (Pittaway, 2018).

One of the examples of musical textures used in the Middle Ages is heterophony. Heterophony suggests that both lines represent the same melody. It might sound in unison in some parts and different in others. Usually, one of the lines adds more musical material to the original melody, such as passing or auxiliary notes. Ian Pittaway (a medieval music performer) in his work is using this example of heterophony:



Fig. 2 Ian Pittaway's example of heterophony (Pittaway, 2018)

Sometimes musicians could sing the same melody in parallel fifths, octaves, and twelfths (fifths taken up an octave). "Fifthing" stands close to parallel harmony – it is a technique where each note of the second voice is an octave or a fifth above the first, with no more than two adjacent notes in parallel octaves or fifths (Pittaway, 2018).



Fig. 3 Ian Pittaway's example of the fifthing of Cantiga de Santa Maria 10 (Pittaway, 2018)

In England and Scotland, people had their "national" style of parallelism – the gymel – when the second musical line was played in thirds or sixths because these intervals were perfect consonants for English people. There is an example of the gymel by Ian Pittaway:



Fig. 4 Ian Pittaway's example of gymels (Pittaway, 2018)

Medieval musicians also used drone notes for the accompaniment. The only rule that they followed, in that case, was that the drone note should be either the finalis or the tenor of the mode.

Talking about sacred music, plainchants (Gregorian chants) were the most common type of church music in the Middle Ages. It was monophonic music and could be sung by one voice or a choir. The texts used for chants were religious, and in Latin or Greek (Saulnier, 2010). Later plainchants became more complex, and the second line was added (organum). These “polyphonic plainchants” were called motets and had strict rules. Some composers of that time wrote their religious music in form of plainchants and motets, for instance, Hildegard of Bingen, Leonin, Perotin, etc. (Berrows, 2012).

2.3 Musical Features of Soundtracks in Video Games about the Middle Ages

Peter Phillips in his essay “Beyond authenticity” writes his thoughts about how the personal interpretation of early music affects historical accuracy (Fallows, Knighton, 1992). He claims that nowadays early music is experiencing the second phase of the “authenticity” revolution which is the desire to make the music expressive again. It is well-shown in Hollywood-style movies and games soundtrack which are affected by the nineteenth-century symphony orchestra sound (especially, powerful vibrato in string section). Modern film composers rely on music's ability to give people new emotions.

Instrumentation

Modern composers who work in the music industry are familiar with software that help write and produce music. Not every project will allow a composer to have a budget for hiring session musicians. That is why modern composers use pre-recorded orchestra sample libraries to produce high-quality music which can be used as a final work for a movie or a game (Kopiez, Wolf, Platz, Mons, 2016). A sample library is a collection of individual sounds (samples) that can be used instead of real musical instruments to create the sound of real instruments using MIDI sequencing software (Melin, 2022). Moreover, as it was mentioned in A1, a lot of composers mix real instruments with synthesizers or synth sample libraries sounds (for instance, Danial Hart used synth sound in “The Green Night” or Jeremy Soul in “The Elder Scrolls V: Skyrim”). Another technique that composers use to make their tracks sound like live recordings while using midi sample libraries is to mix live recordings of instruments with MIDI samples.

Musical Texture and Harmony

There are different textures in music, including homorhythmic homophony, melody and accompaniment, polyphony, and monophony. Common-used polyphony and melody and accompaniment allow composers to present different voices and use complex orchestration.

One of the main differences between modern and medieval music is the invention of tonality. Tonality, or key, is the basic term in modern music theory which refers to the notes of a particular scale that a piece is written with. The key may be in the major or minor tonality. The circle of fifths helps to organise all twelve chromatic pitches as a sequence of perfect fifths.

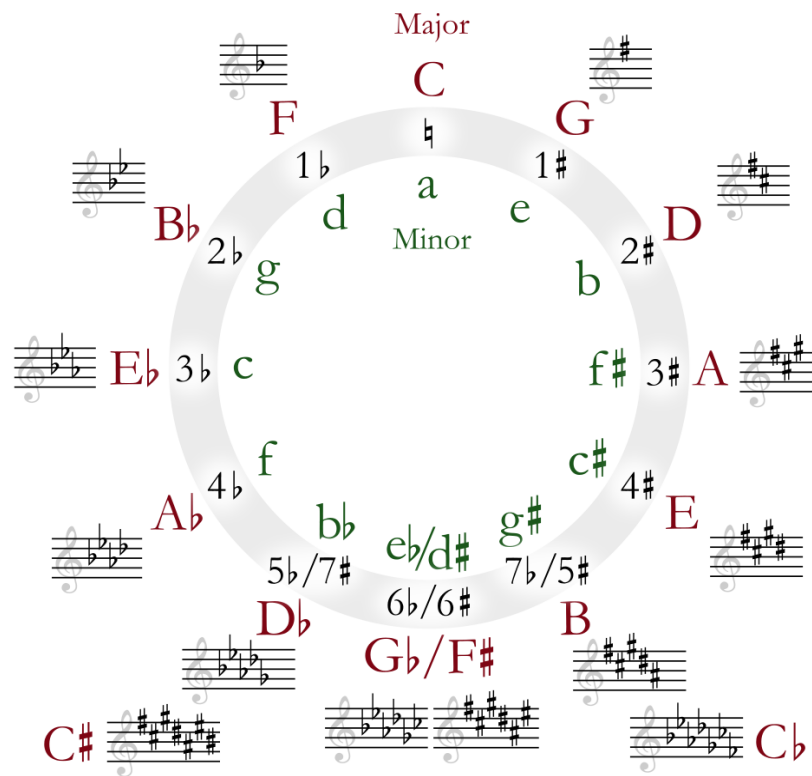


Fig. 5 The circle of fifths

The second main difference is the idea of verticality, or chords, in music. This feature allows composers to write more complex pieces with a larger range of expression and emotionality. This concept of verticality can be presented by harmonic (chord) progressions. Harmonic progression is a route for a melody in a piece which allows the melody to travel within a chosen scale. The fundamental chords are I - ii - iii - IV - V - vi - vii° - I and i - ii° - III - iv - v - VI - VII - i. Capitals in the progression indicate major chords (Persichetti, 1961).

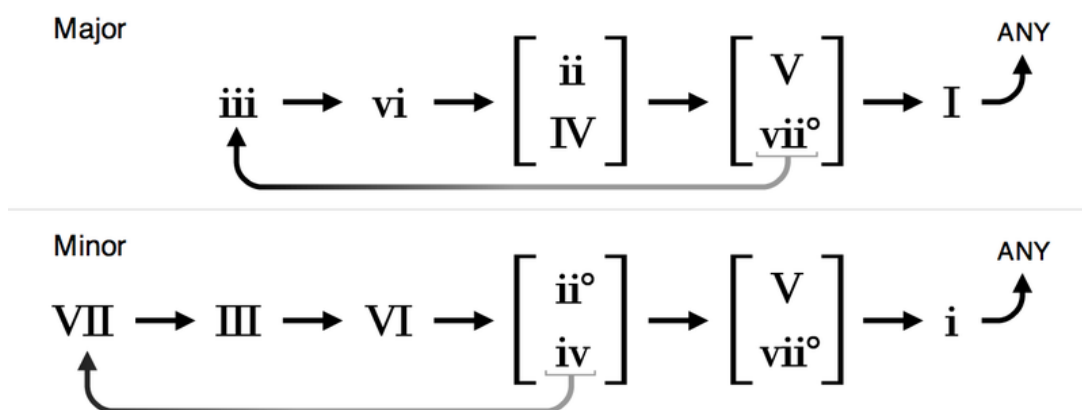


Fig. 6 Major and minor chord progressions

These progressions are the most common in western classical music. However, there are also a lot of different genres and schools in music and each of them can be characterised by their varying style of chord progressions. For this project, it is important to understand the basics of western classical music theory because film scoring and later on game music came from western music starting with Saint-Saens and his first film composition (Davis, 1999).

2.4 Ways of Implementing Music with FMOD and Unity

There are different ways of implementing music in a game. This project works with an asset from the Unity Asset Store which means that music should be implemented in Unity. Unlike a film score, a game soundtrack is not linear and usually contains different layers. These layers have different triggers and parameters which make game audio interactive and it starts responding to changes and events in the game. The music can be implemented inside Unity because it has a fully featured built-in Audio Engine. However, to make the music truly interactive it is better to use an FMOD Project linked to a Unity Project (Robinson, 2019).

FMOD Project

There are different ways to set up a project in FMOD. This work explores the two most common ways of using parameters in a project. Firstly, it is possible to set up a MelodyIn parameter for each layer. This parameter will affect the volume of this or that layer when the trigger starts working. For instance, if a piece is written for an ensemble, with this parameter it will be possible to let instruments play separately or simultaneously, or even mix them randomly together.

If the music contains only two layers - an accompaniment and a melody - it is possible to randomize tracks in a way that, sometimes, either melody or accompaniment can be played alone. On the official FMOD YouTube Channel, sound designer and composer Daniel Sykora shows and explains how to set up this parameter and make it work (Sykora, 2016).

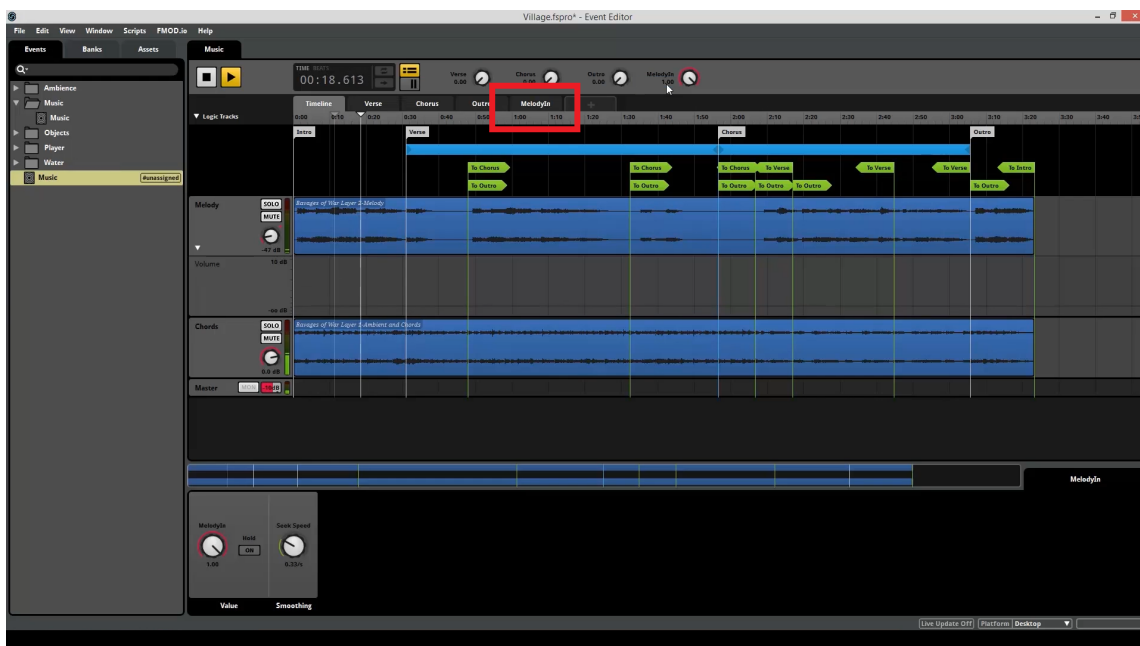


Fig. 7 The screenshot from Daniel Sykora's FMOD tutorial with MelodyIn parameter (Sykora, 2016)

The MelodyIn parameter works with the idea of verticality in a piece. However, it is possible to work with the music horizontally. It can be achieved by dividing a track into different parts and setting up a parameter that, once activated, will jump from one section to another. For instance, if audio consists of Intro, Verse, Chorus, and Outro, this parameter will allow audio to start playing from different sections. These parameters are not the only ones available in FMOD but the most commonly used. Understanding the possibilities of game audio allows a composer, a sound engineer, and a producer to create interactive audio and use it not only in video games but in other projects.

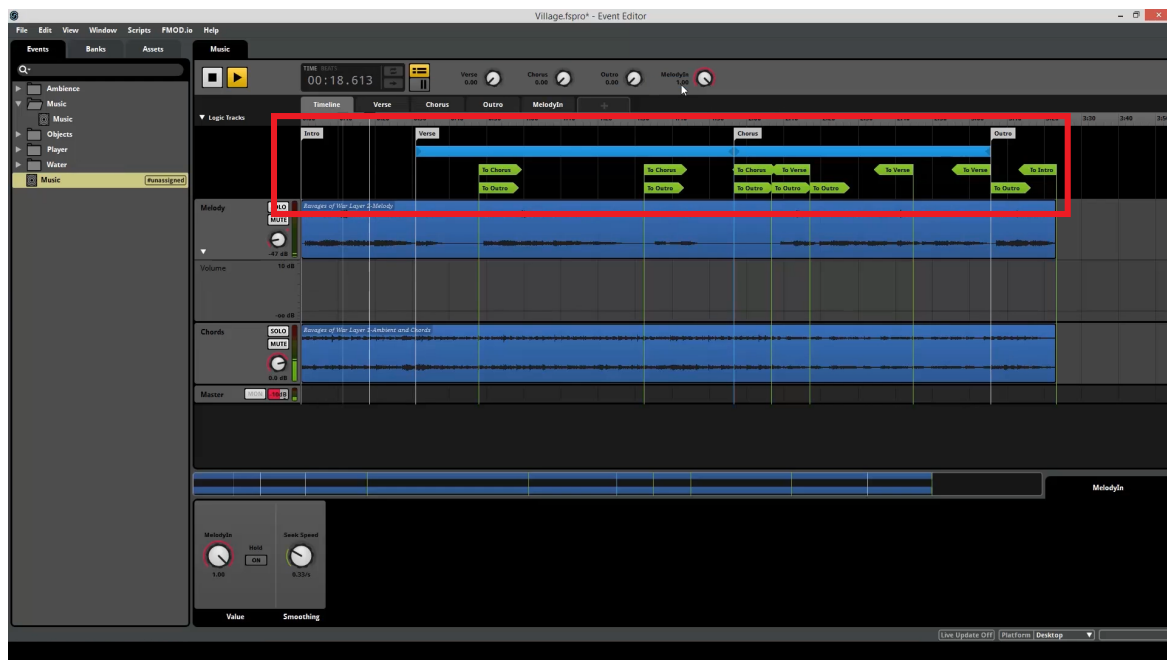


Fig. 8 The screenshot from Daniel Sykora's FMOD tutorial with a timeline (Sykora, 2016)

Diegetic Sound

Diegetic music refers to sounds that originate within the game world. It is opposed to mimetic, or non-diegetic, sounds which originate outside the game world. The use of diegetic music help to immerse a player in a videogame reality. A good example of diegetic sound is the music of GTA V. In this game when a player uses a car, they can tune their radio from the selection of stations. Other examples include explosion sound effects, footsteps sound effects, background ambience, Sentry Drone alert and scan sound effects, and so on (Robinson, 2019).

3. Methodology

Qualitative research was the primary method used in the project. This type of research allows having a detailed analysis of subjectively experienced phenomena. This type of research is “carried out when people wish to understand meanings, interpretations, and to look at, describe and understand an experience, ideas, beliefs and values” (Wisker, 2007, p.75). It provides more content that is useful for practical work.

Also, descriptive research was carried out to “find more about a phenomenon and to capture it with detailed information” (Wisker, 2007, p. 71). It helped to identify compositional techniques and music implementation algorithms needed for completing the practical part of the project.

In the case of this work, music autoethnography is the best way to conduct this research. This method appears in a variety of creative formats, including music compositions. The autoethnography approach helps to expand musicians' awareness of their practices, share their experience with others and prove (or not) the point stated in the research by participating in the research as a conductor and a participant at the same time (Bartleet, Ellis, 2009). In the case of this project, it means that the music is written by the author of the work and all algorithms, techniques and inspirations described in the work apply to the author only.

4. Results & Discussion

4.1 Overview

This project shows three different approaches to writing music for a game set in the Middle Ages. This practical work is based on the research led in A1 and A2. Analyses of music in modern games and films about medieval times in A1 showed that composers use modern harmony instead of verticality; Romantic-orchestral instruments instead of the sound of medieval instruments; and sound library and synthesizers instead of real sound. However, none of them used only medieval compositional techniques in writing a soundtrack. As was shown in the literature review in A1, different researchers, for example, Zanarini and Pearch, think that even if the music in a game is not authentic but works well with the people's perception of “authentic medieval music”, the historical accuracy does not matter. This non-authentic music was used in Artefact 1 of this project. A few composers, for instance, Jan Valta and Adam Sporka, tried to blend contemporary music features with medieval ones. Artefact 2 shows their approach.

This work aims to show that historical accuracy can be present in a medieval-style soundtrack for a game. Artefact 3 uses this approach. To do it further reading was conducted. The literature section in A2 describes compositional techniques used in creating the Artefacts as well as information about the music implementation into a game. As a result, all three Artefacts show different levels of authenticity in a soundtrack for a game set up in the Middle Ages.

4.2 First Level Authenticity, or Artefact 1 (non-authentic)

For the first game, the aim was to compose music with modern features described in A1 after analyzing some films and video games about the Middle Ages. It includes: using synthesizers, writing for the orchestral instruments, and writing in the style of other periods, for instance, Baroque. Artefact 1 aims to show the most popular modern composers' approach to writing music for a game set up in the Middle Ages. To show its practical value, this music was implemented in the game using FMOD and Unity.

Landscape Music

This landscape track contains seven layers. Each layer is one instrument used in this piece. In terms of instrumentation, this landscape track is far from medieval authentic music. The instruments of this piece can be divided into two groups: Romantic orchestra conventional instruments and synthesizers. The first group includes the flute, the modern harp, and the cello. The second group contains Alchemy instruments.

It should be mentioned that Alchemy instruments are produced sampled sounds, which are pitched differently. So, in the score, it is indicated as an actual key which was pressed to produce the sound of the instrument instead of a melody line this or that instrument has.

This track contains one flat which makes it either F major or D minor. As was mentioned in the book by Fallows and Knighton and pointed out in the Further Literature section, the idea of keys was not widely used in the Middle Age. However, nowadays, learning this part of music theory is the first step in learning music.

Fairy and Dandelion
Landscape music
Arina Brovanova

The musical score for 'Fairy and Dandelion' is presented in a multi-staff format. The title 'Fairy and Dandelion' is centered at the top, followed by the subtitle 'Landscape music' and the composer's name 'Arina Brovanova'. The score is in 4/4 time with a key signature of one flat (Bb). It is divided into two sections: 'Intro' (measures 1-2) and 'Versus' (measures 3-4). The 'Intro' section has a tempo marking of '♩ = 100'. The 'Versus' section begins with a '3' over the first measure, indicating a triplet. The instruments and their parts are as follows: Flute (measures 3-4, mf), Harp (measures 3-4, mp), Violoncello (measures 3-4, mp, with the instruction '(let the root ring) mute'), Work of Fairies (measures 3-4, p), Calming Mantra (measures 3-4, p), Celtic Fairy (measures 3-4, mf), and Floating Dreams (measures 3-4, mp). The 'Work of Fairies' layer includes the instruction 'ALCHEMY (x4):'.

Fig. 9 Artefact 1 Landscape music score

This track does not have any recorded sounds. Instead of this, sample libraries (which sampled short sounds of real instruments but with different parameters applied) were used:

- Logic Pro Default Patch: Celtic Harp,
- String Essentials: Cello,
- Woodwind Essential: Flute,
- and Alchemy: Work of Fairies, Calming Mantra, Celtic Fairy, and Floating Dreams.

This track was produced in Logic Pro DAW software. Different automation parameters were applied to make music sound real. For instance, expression, velocity, and force legato function. Also, reverb made instruments sound real because it gave a feeling of a room.

Many projects today do not have enough budget to hire session musicians and rent a venue. Sample libraries become a solution to this problem. Landscape Music of Artefact 1 not only shows how contemporary composers' music might sound but also explores the possibility of producing music and delivering the final result with digital resources only.

After writing music with MIDI, all tracks were bounced as it is shown in Fig. 11. It allows to work with audio instead of MIDI tracks and apply parameters which make sense for bounced music (such as final automation, fade in and fade out curves, etc.)

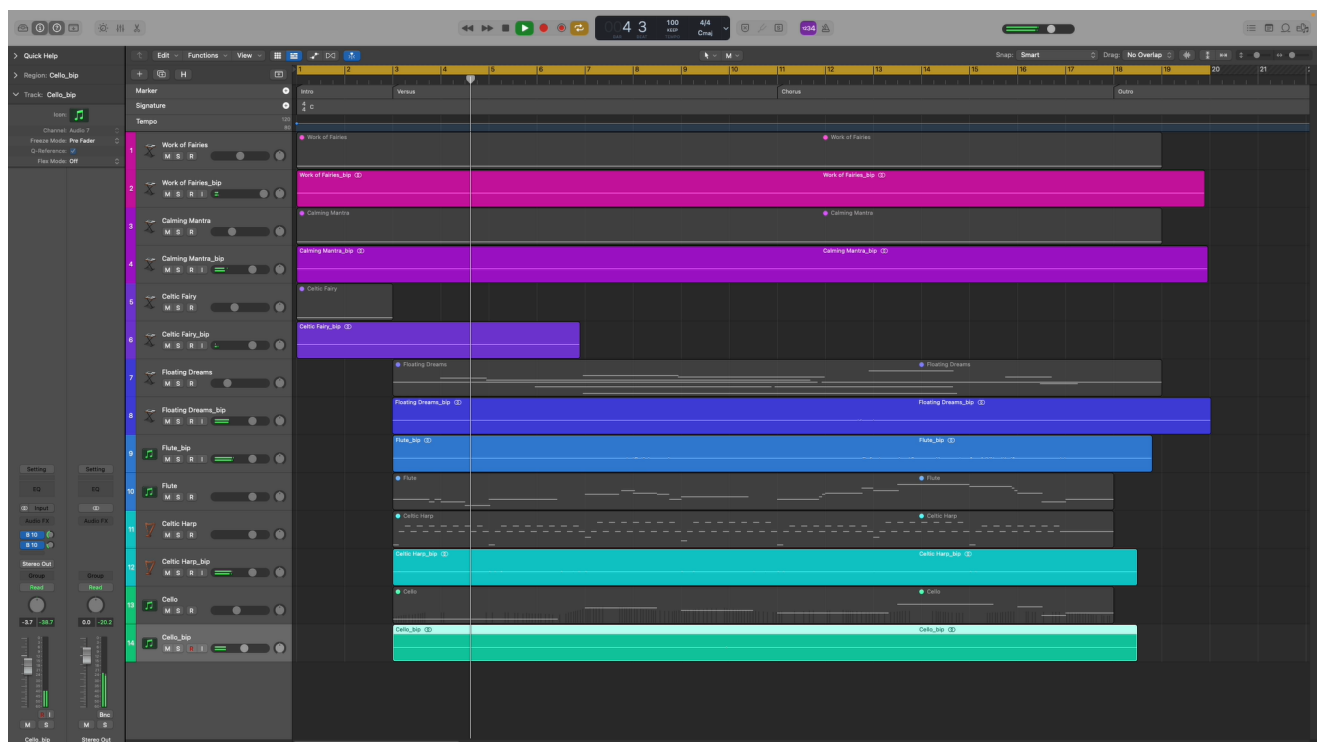


Fig. 10 Artefact 1 Landscape music Logic Pro project

To sum up, this track contains these modern features:

1. Modern instrumentation: orchestra instruments and synthesizers.
2. Lack of real sound: using sample libraries.
3. Idea of keys: F major/D minor.

Tavern Music

This tavern piece of music was inspired by Jeremy Soule's tavern track The Bannered Mare from The Elder Scrolls V: Skyrim game. Music from this game was analysed in A1. In his music, Jeremy Soul used Baroque compositional form and techniques, and a neo-Romantic approach influenced by Howard Shore and Harry Gregson-Williams. He stylised the tavern music as troubadour music, wrote it in Renaissance and Baroque style and focused on such instruments as the guitar (lute) and the flute (recorder).

The Elder Scrolls V
SKYRIM

THE BANNED MARE

Written by: Jeremy Soule
Transcription & analysis by Erik Hoeting

$\text{♩} = 446.5 \text{ Hz}$ A Journey's Respite ($\text{♩} \approx 54$)

A *lute + guitar*

B

C

Chord symbols (Roman numerals) are provided above the staff for each measure:

- Measure 1: Dm: i
- Measure 2: Dm
- Measure 3: VII C
- Measure 4: VI Bb
- Measure 5: iv Gm
- Measure 6: V A
- Measure 7: i⁶ Dm/A
- Measure 8: VII C
- Measure 9: VI Bb
- Measure 10: ii⁶ Em7b5/G
- Measure 11: V A
- Measure 12: i Dm
- Measure 13: F: I
- Measure 14: V C
- Measure 15: vi Dm
- Measure 16: IV Bb
- Measure 17: V C
- Measure 18: I F
- Measure 19: V C
- Measure 20: Dm: vi
- Measure 21: VI Bb
- Measure 22: v Am
- Measure 23: i Dm
- Measure 24: i⁶ Dm/F
- Measure 25: VII⁶ C/E
- Measure 26: VI⁶ Bb/D
- Measure 27: ii⁶ Em7b5/D
- Measure 28: V A/C#
- Measure 29: V⁶ A
- Measure 30: i⁶ Dm/F
- Measure 31: VII⁶ C/E
- Measure 32: VI⁶ Bb/F
- Measure 33: V⁶ Dm
- Measure 34: i A/C#
- Measure 35: i Dm
- Measure 36: F: F
- Measure 37: V C
- Measure 38: V⁷/vi A7
- Measure 39: vi Dm
- Measure 40: V C
- Measure 41: I F
- Measure 42: V⁶ C/E
- Measure 43: v⁷/vi Am7
- Measure 44: vi Dm
- Measure 45: VI Bb
- Measure 46: v Am
- Measure 47: i Dm
- Measure 48: V A
- Measure 49: i Dm
- Measure 50: VI Bb

Fig. 11 The score of The Bannered Mare by Jeremy Soule

Tavern music of Artefact 1 contains a lot of the same features of The Bannered Mare soundtrack. Both pieces are written for more than one guitar (melody and accompaniment); contain the idea of verticality and are based on chords; use some ornament elements built into the scores. The structures of the pieces are different, but both contain repeats. For instance, Soule's piece of music consists of a structured A-B-A'-B'-C-A-B form, and this project's work has an A-B-B'-C structure.

Interestingly, this music sounds and looks more like one of Bach's lute suites than troubadour music. It does not have any percussion sound, flows smoothly and sounds far from what people usually think medieval secular music is (see Appendix 1).

Talking about harmony, this piece is written in D major key (two sharps). That is why, in comparison with Jeremy Soule's piece which is written in D minor and uses minor chord progression, the tavern track of Artefact 1 uses major chord progression. It starts with tonic (I) and then continues with the following chords: I – IV – ii – IV – V – vi – I⁶.

Lute/Guitar

C`mere till I tell ye
Tavern music

Arina Brovanova

Narratively

D: I IV ii IV V
vi I⁶

Fig. 12 Chord progression in Tavern Music of Artefact 1

To sum up, this track contains these features:

1. Idea of verticality (chords).
2. Baroque style instead of medieval style.
3. Idea of keys: D major/ B minor.

FMOD & Unity Implementation

To make music interactive all layers of the soundtrack were added to the FMOD project. In this case, both Tavern and Landscape tracks have the same length which makes it possible to set up one Loop and make music interactive with MelodyIn parameters. This project contains four MelodyIn parameters made for Tavern 1, Tavern 2, Flute and Landscape (all Landscape Music instruments played together without the flute) layers. Once the MelodyIn parameter is triggered (set up at 1), this or that layer goes up in volume. For instance, if Tavern 1 parameter is set up on 1 and all other parameters are set up on 0, Tavern 1 layer will be playing alone.

Also, FMOD makes it possible to make changes between instruments smoother by using Seek parameter for each MelodyIn parameter. It controls how fast this or that layer will reach the volume maximum. If this parameter is set up on 0, the change will happen immediately and will sound quite rough. That is why in this project the parameter was set up at 0.33ms. It makes this transition happen in 0.33 ms instead of the very second after changing the MelodyIn parameter at 1.

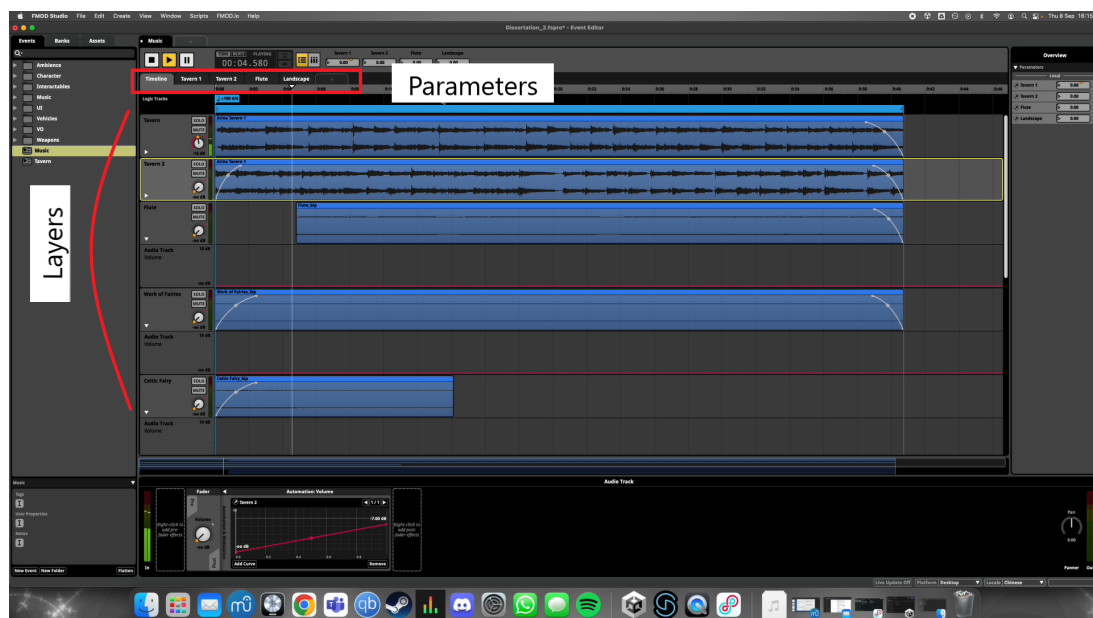


Fig. 13 FMOD project for Artefact 1

Then this FMOD project was linked to the Unity project. It usually happens automatically after installing a special FMOD for Unity package on the computer. After doing so, Unity will replace the built-in Audio Engine with FMOD Engine and the chosen FMOD project will be linked to the Unity project and all parameters from the FMOD project will appear in the Unity Project.

As it was previously pointed out by Sykora and shown in the Further Literature section, one of the common-used ways to achieve music interactivity in a game is to use different zones indicated by transparent 3D objects with different parameter sets. Once a player triggers the zone (an object), this or that parameter starts working and music changes (the detailed algorithm for setting up the zones can be found in Appendix 2).

Four 3D objects were set up for the first game: two cubes and two spheres. Each of the objects has a music component linked, or tagged, with a trigger - Player. Once the trigger enters the object, the parameters used for this object start working. However, when the trigger (the player) leaves the object, parameters stop working, and default music starts playing. In this case, the default music is landscape music without the flute.

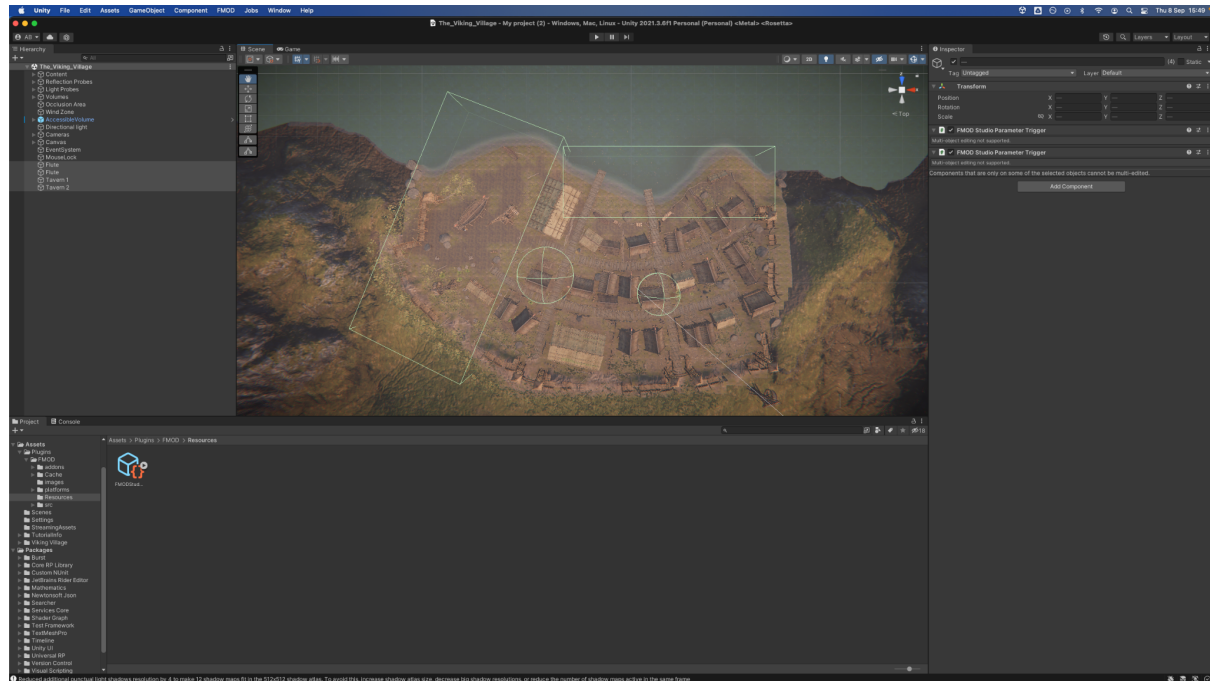


Fig. 14 Unity project for Artefact 1

In Artefact 1 cubes trigger Flute MelodyIn parameters. Every time the player comes to the cube areas, the flute starts playing (above default Landscape music). Spheres trigger Tavern 1 and Tavern 2 parameters while the Landscape music fades out in volume. The tavern music can be a good example of diegetic sound because these two spheres indicate two taverns on the map. Also, these two buildings have special “tavern noises”, set up as 3D events in FMOD and played every time the player passes the buildings.

4.3 Second Level Authenticity, or Artefact 2 (less authentic)

The second game's soundtracks contain both medieval and modern music features. It recreates the music approach used by Jan Valta and Adam Sporka for the game Kingdom Come: Deliverance. The soundtrack from this game was analysed in A1.

Landscape Music

This track contains a mix of modern and medieval instruments. The first group includes:

- Percussion group (the shaker, the concert toms, some additional percussion instruments not indicated in the score);
- String group (the violin, the viola, the cello);
- The flute and the harp*

The second group includes:

- The dulcimer;
- The voice;
- The flute and the harp.

The flute and the harp can be included in both groups because, on the one hand, these instruments were modernised, but on the other hand, the ancient harp and the recorder which is a woodwind instrument were in use in the Middle Ages.

Talking about the music texture, this track uses melody and accompaniment texture which was popular in Early music. The flute plays the role of the solo instrument, as it could be in secular medieval music.

Peaceful Village
Landscape music

Melody

Accompaniment

Arina Brovanova

Fig. 15 The score of the Landscape music of Artefact 2

This track is written in Dorian mode but at the same time contains the modern idea of verticality which is presented in the string section. Three instruments of the string group play one of the triad's notes and the piece follows this verticality (chords).

Also, as Artefact 1, this track was produced in a DAW (Cubase Artist 11) with sample libraries only, including:

- BBC Symphony Orchestra Discover (Spitfire Audio): Flute, Violin, Viola, Cello, Harp, Percussions.
- LABS (Spitfire Audio): Dulcimer, Percussions, Voice.

The inspiration for the track was the soundtrack Aen Seidhe by Mikolai Stroinski from the Witcher 3: Wild Hunt video game (music from this game was analysed in A1). Both tracks have vocalisation, a strong feeling of beats indicated by the percussion layer, and orchestra instruments.

To sum up, this track contains these features:

1. Idea of verticality (chords).
2. Mix of medieval and modern instruments.
3. Idea of modality: Dorian mode.
4. Lack of real sound: using sample libraries.
5. Early secular music texture: melody and accompaniment.

Tavern Music

This track includes the following medieval features: modality; and secular medieval music texture. Melody and accompaniment music texture is very popular nowadays, however, it also was used in the Middle Ages. That is why this feature can be included in a group of medieval features. In this track, the solo instrument is the flute (in the Middle Ages, it also would be a woodwind instrument, usually, the recorder).

The image displays a musical score for a track titled 'Tavern Music'. It is divided into two main sections: 'Melody' and 'Accompaniment'. The 'Melody' section features a single staff for a Flute (Fl.) with measures 13 through 16. The notes are G, Gsus4, G, and Gsus2. The 'Accompaniment' section includes staves for Ukulele (Uk.), Bass Guitar (B. Guit.), Conga Toms (C. Toms), Tambourine (Tamb.), Shaker (Sh.), and Clapping (Clp.). The Ukulele part starts with a mezzo-forte (mf) dynamic. The percussion instruments (C. Toms, Tamb., Sh., and Clp.) provide a steady rhythmic accompaniment. A red bracket on the left side groups the accompaniment instruments together, and another red bracket highlights the melody staff.

Fig. 16 Music texture in Tavern Music of Artefact 2

Talking about the modern features, this track is written for such “young” instruments as the ukulele, the bass guitar, and the modern percussion group (including the concert toms). In this case, the ukulele and the bass guitar replace the authentic lute and the concert toms replace medieval nakers. Although the track uses modern instrumentation, it sounds in the style of troubadour music. The inspiration for this tavern music was the soundtrack Drink Up, There’s More! by Percival Schuttenbach from The Witcher 3: Wild Hunt.

The image displays a musical score for the song "The Sound of Silence" by Simon & Garfunkel. The score is written for a multi-instrument ensemble. The instruments and their parts are as follows:

- Flute:** Plays a melodic line in the key of G major (one sharp) and 3/4 time. The notes are G4, A4, B4, C5, D5, E5, F#5, G5, A5, B5, C6, D6, E6, F#6, G6, A6, B6, C7, D7, E7, F#7, G7, A7, B7, C8, D8, E8, F#8, G8, A8, B8, C9, D9, E9, F#9, G9, A9, B9, C10, D10, E10, F#10, G10, A10, B10, C11, D11, E11, F#11, G11, A11, B11, C12, D12, E12, F#12, G12, A12, B12, C13, D13, E13, F#13, G13, A13, B13, C14, D14, E14, F#14, G14, A14, B14, C15, D15, E15, F#15, G15, A15, B15, C16, D16, E16, F#16, G16, A16, B16, C17, D17, E17, F#17, G17, A17, B17, C18, D18, E18, F#18, G18, A18, B18, C19, D19, E19, F#19, G19, A19, B19, C20, D20, E20, F#20, G20, A20, B20, C21, D21, E21, F#21, G21, A21, B21, C22, D22, E22, F#22, G22, A22, B22, C23, D23, E23, F#23, G23, A23, B23, C24, D24, E24, F#24, G24, A24, B24, C25, D25, E25, F#25, G25, A25, B25, C26, D26, E26, F#26, G26, A26, B26, C27, D27, E27, F#27, G27, A27, B27, C28, D28, E28, F#28, G28, A28, B28, C29, D29, E29, F#29, G29, A29, B29, C30, D30, E30, F#30, G30, A30, B30, C31, D31, E31, F#31, G31, A31, B31, C32, D32, E32, F#32, G32, A32, B32, C33, D33, E33, F#33, G33, A33, B33, C34, D34, E34, F#34, G34, A34, B34, C35, D35, E35, F#35, G35, A35, B35, C36, D36, E36, F#36, G36, A36, B36, C37, D37, E37, F#37, G37, A37, B37, C38, D38, E38, F#38, G38, A38, B38, C39, D39, E39, F#39, G39, A39, B39, C40, D40, E40, F#40, G40, A40, B40, C41, D41, E41, F#41, G41, A41, B41, C42, D42, E42, F#42, G42, A42, B42, C43, D43, E43, F#43, G43, A43, B43, C44, D44, E44, F#44, G44, A44, B44, C45, D45, E45, F#45, G45, A45, B45, C46, D46, E46, F#46, G46, A46, B46, C47, D47, E47, F#47, G47, A47, B47, C48, D48, E48, F#48, G48, A48, B48, C49, D49, E49, F#49, G49, A49, B49, C50, D50, E50, F#50, G50, A50, B50, C51, D51, E51, F#51, G51, A51, B51, C52, D52, E52, F#52, G52, A52, B52, C53, D53, E53, F#53, G53, A53, B53, C54, D54, E54, F#54, G54, A54, B54, C55, D55, E55, F#55, G55, A55, B55, C56, D56, E56, F#56, G56, A56, B56, C57, D57, E57, F#57, G57, A57, B57, C58, D58, E58, F#58, G58, A58, B58, C59, D59, E59, F#59, G59, A59, B59, C60, D60, E60, F#60, G60, A60, B60, C61, D61, E61, F#61, G61, A61, B61, C62, D62, E62, F#62, G62, A62, B62, C63, D63, E63, F#63, G63, A63, B63, C64, D64, E64, F#64, G64, A64, B64, C65, D65, E65, F#65, G65, A65, B65, C66, D66, E66, F#66, G66, A66, B66, C67, D67, E67, F#67, G67, A67, B67, C68, D68, E68, F#68, G68, A68, B68, C69, D69, E69, F#69, G69, A69, B69, C70, D70, E70, F#70, G70, A70, B70, C71, D71, E71, F#71, G71, A71, B71, C72, D72, E72, F#72, G72, A72, B72, C73, D73, E73, F#73, G73, A73, B73, C74, D74, E74, F#74, G74, A74, B74, C75, D75, E75, F#75, G75, A75, B75, C76, D76, E76, F#76, G76, A76, B76, C77, D77, E77, F#77, G77, A77, B77, C78, D78, E78, F#78, G78, A78, B78, C79, D79, E79, F#79, G79, A79, B79, C80, D80, E80, F#80, G80, A80, B80, C81, D81, E81, F#81, G81, A81, B81, C82, D82, E82, F#82, G82, A82, B82, C83, D83, E83, F#83, G83, A83, B83, C84, D84, E84, F#84, G84, A84, B84, C85, D85, E85, F#85, G85, A85, B85, C86, D86, E86, F#86, G86, A86, B86, C87, D87, E87, F#87, G87, A87, B87, C88, D88, E88, F#88, G88, A88, B88, C89, D89, E89, F#89, G89, A89, B89, C90, D90, E90, F#90, G90, A90, B90, C91, D91, E91, F#91, G91, A91, B91, C92, D92, E92, F#92, G92, A92, B92, C93, D93, E93, F#93, G93, A93, B93, C94, D94, E94, F#94, G94, A94, B94, C95, D95, E95, F#95, G95, A95, B95, C96, D96, E96, F#96, G96, A96, B96, C97, D97, E97, F#97, G97, A97, B97, C98, D98, E98, F#98, G98, A98, B98, C99, D99, E99, F#99, G99, A99, B99, C100, D100, E100, F#100, G100, A100, B100, C101, D101, E101, F#101, G101, A101, B101, C102, D102, E102, F#102, G102, A102, B102, C103, D103, E103, F#103, G103, A103, B103, C104, D104, E104, F#104, G104, A104, B104, C105, D105, E105, F#105, G105, A105, B105, C106, D106, E106, F#106, G106, A106, B106, C107, D107, E107, F#107, G107, A107, B107, C108, D108, E108, F#108, G108, A108, B108, C109, D109, E109, F#109, G109, A109, B109, C110, D110, E110, F#110, G110, A110, B110, C111, D111, E111, F#111, G111, A111, B111, C112, D112, E112, F#112, G112, A112, B112, C113, D113, E113, F#113, G113, A113, B113, C114, D114, E114, F#114, G114, A114, B114, C115, D115, E115, F#115, G115, A115, B115, C116, D116, E116, F#116, G116, A116, B116, C117, D117, E117, F#117, G117, A117, B117, C118, D118, E118, F#118, G118, A118, B118, C119, D119, E119, F#119, G119, A119, B119, C120, D120, E120, F#120, G120, A120, B120, C121, D121, E121, F#121, G121, A121, B121, C122, D122, E122, F#122, G122, A122, B122, C123, D123, E123, F#123, G123, A123, B123, C124, D124, E124, F#124, G124, A124, B124, C125, D125, E125, F#125, G125, A125, B125, C126, D126, E126, F#126, G126, A126, B126, C127, D127, E127, F#127, G127, A127, B127, C128, D128, E128, F#128, G128, A128, B128, C129, D129, E129, F#129, G129, A129, B129, C130, D130, E130, F#130, G130, A130, B130, C131, D131, E131, F#131, G131, A131, B131, C132, D132, E132, F#132, G132, A132, B132, C133, D133, E133, F#133, G133, A133, B133, C134, D134, E134, F#134, G13

Also, this track uses the concept of verticality when the piece follows a certain chord progression. In the case of this track, chords are played on the ukulele as follows: G - Gsus4 - G - Gsus2. In the score, it is indicated as chords above the rhythmic pattern the ukulele plays.

It should be mentioned that all instruments except the flute were recorded. The sound of the flute was achieved by using the Default Logic Pro patch, Native American Flute instrument sound, in particular. This MIDI track has different reverb audio effects put on Buses, it makes it sound more realistic because it includes the spaces of the room in the music.

Fig. 19 Logic Pro project of tavern music of Artefact 2

To sum up, this track contains these features:

1. Idea of verticality (chords).
2. Modern instrumentation.
3. Idea of modality: Mixolydian mode.
4. Recorded sound mixed with a sample library's sound.
5. Early secular music texture: melody and accompaniment.

FMOD & Unity Implementation

This FMOD project is more complex than Artefact 1. Firstly, in Artefact 1 layers with the accompaniment in the landscape track are united together which makes the track uses two parameters only - one for the melody and another for the accompaniment. Secondly, Artefact 1 has one Loop only. In Artefact 2, the landscape track was divided into different layers: Flute, Voice, Viola, Harp, and Percussion. The default music a player hears when the game starts includes two layers: Harp and Percussion. However, in some areas of the game world, the harp or the percussion might be silent. The tavern track is not divided into layers and plays as a solid piece.

In comparison with Artefact 1, this project has three loops because tavern music does not have the same length as landscape music. The solution for this situation was an extra Tavern parameter which was linked to the loop and worked together with the TavernIn (MelodyIn parameter for the tavern layer) parameter. Thus, every time player enters the 3D “tavern” object, both TavernIn and Tavern parameters start working which means that the tavern layer sound goes up and the special loop for the tavern is triggered.

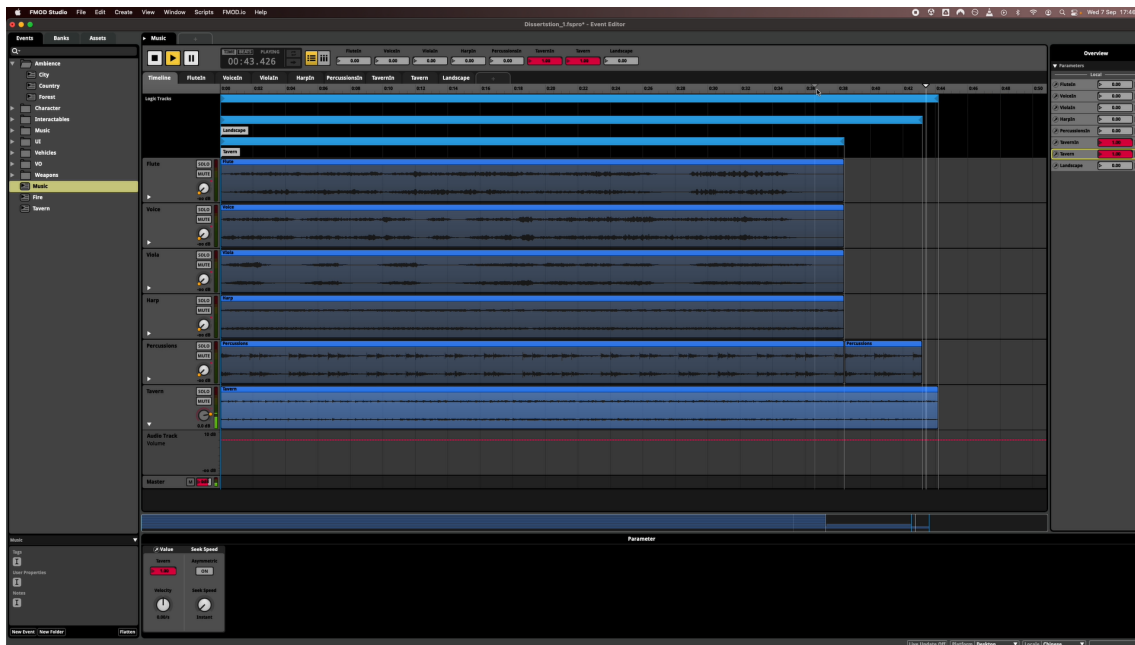


Fig. 20 FMOD project for Artefact 2

However, when the player leaves the tavern area, there should not be silence if the landscape layer is not present in the timeline. That is why the landscape track was expanded with the percussion layer and the percussion special loop was triggered all the time when PercussionIn equals 1. In case there is no percussion layer in a zone, the default loop will be played

automatically. As it is shown in Fig. 22, all cubes touched by the tavern cube have a percussion layer, so the transition between landscape and tavern music could be smoother with the help of one of the special loops discussed earlier. In comparison with Artefact 1, this project combines different layers of landscape music and shows the idea of more music interactivity (while Artefact 1 was more linear, almost like a film score).

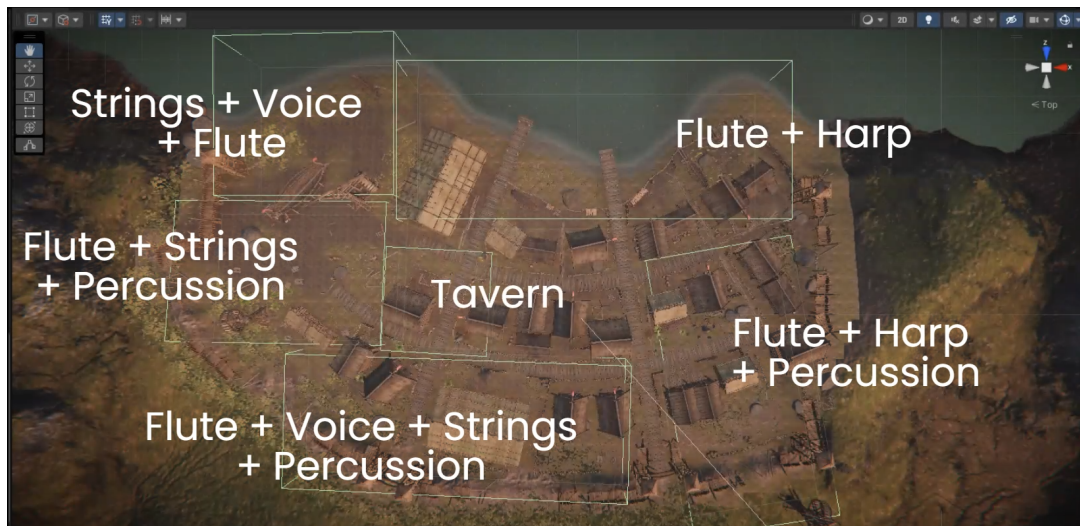


Fig. 21 Unity project map for Artefact 2

Also, for a better immersive experience, the project contains two 3D timeline events - one for the tavern noises and another for the torches sound. The first event is linked to the tavern building on the map and the second event is linked to every torch in the game. The 3D timeline allows one to experience the sound in 3D scale - the closer a player to the object, the louder the sound will be (the detailed algorithm for setting up the zones can be found in Appendix 2).

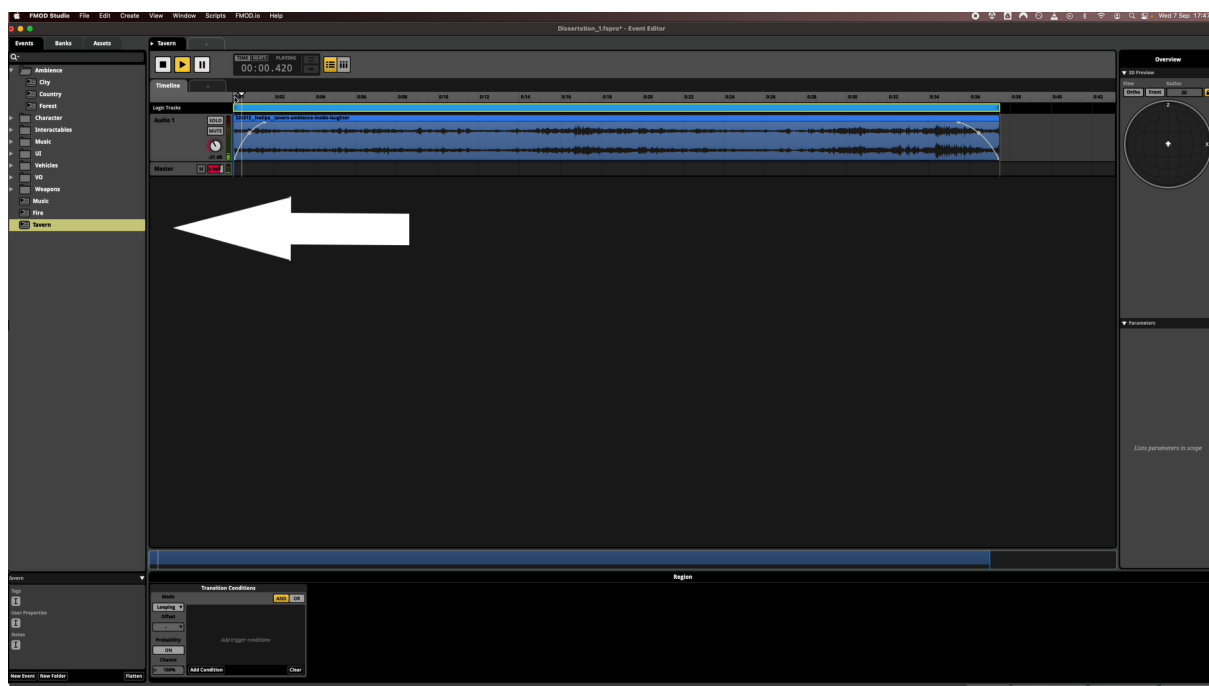


Fig. 22 3D events with fire sound and tavern noises in FMOD Project for Artefact 2

4.4 Third Level Authenticity, or Artefact 3 (authentic)

One of the research questions stated in A1 was what is the way to achieve authenticity in games about the Middle Ages. It led to the practical task – to compose the track with medieval authentic features only. Artefact 3 is a practical way to show that historic accuracy and music immersion can work together. Authenticity in Medieval Game Music is possible and should be considered as one of the approaches for writing a music composition for interactive game worlds.

Landscape Music

There are four tracks which might be considered both separately and together as landscape music of Artefact 3. Landscape music in Artefact 3 is made in the style of a medieval Gregorian chant (plainchant) which is medieval sacred music and has traditional early music texture. Tenor 1 is written in Dorian and then in Hypophrygian mode (in the Middle Ages a piece could have different modes throughout a composition). Interestingly, if in the game a player hears only Tenor 1, it means that they hear a traditional monophonic plainchant. However, when it comes to adding other voices, for instance, Tenor 4, instead of a plainchant, a player listens to organum which is still written in Mixolydian mode.

Talking about other voices, in the Further Reading section of A2, the medieval rules are described with the examples by Pittaway. Thus, other voices could be sung only in unison (it would be monophonic plainchant), fifths, octaves, or could be a drone (which is one note only). Each layer of landscape music in Artefact 3 shows one of the possibilities for polyphony, or one of the intervals mentioned above.

Sacred Nature
Landscape music
Arina Brovanova

The musical score is titled 'Sacred Nature' and is identified as 'Landscape music' by Arina Brovanova. It consists of four staves, each representing a different vocal or instrumental part: Unison (Tenor 1), Octave (Tenor 2), Fifth (Tenor 3), and Drone (Tenor 4). The tempo is indicated as quarter note = 60. The Unison part (Tenor 1) features a melodic line with dynamics of piano (p) and mezzo-piano (mp). The Octave part (Tenor 2) provides a harmonic support with a piano (p) dynamic. The Fifth part (Tenor 3) also features a melodic line with dynamics of p and mp. The Drone part (Tenor 4) consists of a single sustained note with a piano (p) dynamic. The score is written in a medieval style with a single clef for all parts and a common time signature.

Fig. 23 Landscape music of Artefact 3

Also, it should be said that religious music in the Middle Ages had to have fewer emotions and more meaning in it (through words). In the case of Artefact 3, this Gregorian chant does not have lyrics and is sung as a vocalise. It is made on purpose because it would be inappropriate to use one of the religious texts without any meaning as the church usually had for each sacred song and ritual.

The inspiration for this music was a Gregorian chant *Pange lingua gloriosi* sung by Harry Hagan. The text was written in the 13th century by St. Thomas Aquinas, the Angelic Doctor. He is known as the Common Doctor of the Church.

All voices in the track were recorded. To achieve the special spacious sound of Gregorian chant, two different cathedral reverbs were added. This music does not have big dynamic automation. Also, the tempo of the music is quite slow and musical lines are written with the idea of strong beats absence in mind. This music should flow naturally without relying on BPM and strong and weak beats.



Fig. 24 Logic Pro project for landscape music of Artefact 3

To sum up, this track contains these medieval features:

1. Idea of intervals instead of chords.
2. Medieval instrumentation: Voice.
3. Idea of modality: Mixolydian and Hypophrygian mode for Tenor 1.
4. Real recorded sound.
5. Early sacred music texture.

Tavern Music

The inspiration for the tavern music was the album *Music of Troubadours* by Unicorn Ensemble and, in particular, the song *Tan m'abelis jois et amors e chant*. This tavern music is made as an actual secular troubadour medieval song. The lyrics of the song are taken from the 14th-century *Song of Wanderer*. This poem was found in a paper manuscript of the 14th century which was used as a songbook with riddle-verses by a wandering singer (Thomas, 1968). This song is written in Old German which fits perfectly with the idea of the Vikings in the game because historically Vikings spoke in the German dialect.

Willekome, varender man!
 wo läge du hinaht?
 oder wo mitte wäre du bedaht?
 oder in welre hande wise
 bejageste kleider oder spise?

Nu sage mir, meister Trougemunt,
 zwei und sübenzig lant die sint dir kunt:
 waz boumes birt ane blüt?
 waz vogel söiget sine junge?
 waz vogel ist ane zunge?
 waz vogel ist ane mage?
 kanstu mir des ützüt gesagen,
 so wil ich dich für ein weidelichen knappen haben.

'Welcome here, Oh wanderer!
 Where did you spend the night?
 What sheltered you from cold and fright?
 Tell me how and by what feat
 did you get clothes and food to eat?'

'Master Wanderer, I own
 two-and-seventy lands to you are known—
 what tree can bear without a bloom,
 what bird gives milk to feed its young,
 what bird is there which has no tongue,
 what bird is there which has no crawl?
 I'll admit I never saw
 a smarter youth if you can tell me all of that.'

('Song of the Wanderer', the 14th century)

Fig. 25 Lyrics and translation of the tavern song in Artefact 3

In terms of instrumentation, it can be claimed that the sound is as close to the authentic medieval sound as possible. Firstly, all instruments were recorded. Secondly, the voice and the recorder were usual medieval instruments and also used in this song, Thirdly, the guitar and the viola were used in this track to recreate the sound of the lute and the fiddle.

Willekome, Varender Man
Tavern music

Unknown lyricist Arina Brovanova

♩ = 110

The musical score is for the song 'Willekome, Varender Man'. It is written for five parts: Voice, Recorder, Viola, Lute, and Percussion. The tempo is marked as ♩ = 110. The key signature has one sharp (F#) and the time signature is 4/4. The Voice part has the lyrics 'Will - le - ko - me, va - ren - der -'. The Recorder part has a whole rest in the first measure and a half rest in the second. The Viola part has a whole rest in the first measure and a half rest in the second. The Lute part has a whole rest in the first measure and a half rest in the second, followed by a melody starting on a G4. The Percussion part has a whole rest in the first measure and a half rest in the second.

Fig. 26 The score of tavern music in Artefact 3

This song uses different musical textures. Voice is a solo instrument here, so it is possible to talk about melody and accompaniment music texture. However, it is not the only music texture used. In some parts of the score, the heterophony texture, mentioned in the Further

Literature section (with Pittaway's examples), is seen in the recorder and the viola parts. Also, the song contains recitative parts which were commonly used by troubadours in the Middle Ages. The melody line does not rely on strong and weak beats as well as the lute/guitar part. The song is a good example of medieval stylisation and authentic medieval music in the game.



Fig. 27 Heterophony in tavern music of Artefact 3

To sum up, this track contains these medieval features:

1. Concept of horizontality.
2. Medieval instrumentation: Viola as Fiddle, Recorder, Guitar as Lute, Voice.
3. Idea of modality: Mixolydian.
4. Real recorded sound.
5. Early secular music textures: Melody and accompaniment; Heterophony.
6. Authentic medieval text (lyrics).

FMOD & Unity Implementation

Although the music of Artefact 3 is less complex than the two previous works, the FMOD project shows much more complexity in comparison with others. Firstly, it should be mentioned that this project uses more sound design than other Artefacts. Thus, it contains traditional for this game tavern noises (with cut high frequency so it would sound like the sound goes from inside the tavern building), torch/fire sound, wood creak sound for the two wooden wheels in the village, and the water sound. The first three sounds work as 3D sounds and are linked to the existing objects on the map such as torches, wooden wheels and the tavern building. The sound of water is made in a 2D event and linked to the transparent cube. When a player enters the cube, the subtle sound of water starts working and a player can experience both the image of water and its sound.

Secondly, this project uses the MelodyIn parameter. This parameter is used for each voice layer and the tavern track. The landscape audio and the tavern song have different lengths so the best solution for changing from one track to another is to have destination markers and use transition parameters. Destination markers are white squares in the project and transition markers are green. From landscape music, it is possible to jump only to one marker in the tavern song which is the beginning of the piece. However, when music needs to change from tavern to landscape, it can jump to one of the seven markers in the landscape track. The transition parameter from landscape to the tavern is called To Tavern and the transition parameter leads back to the landscape track in Tavern Out.

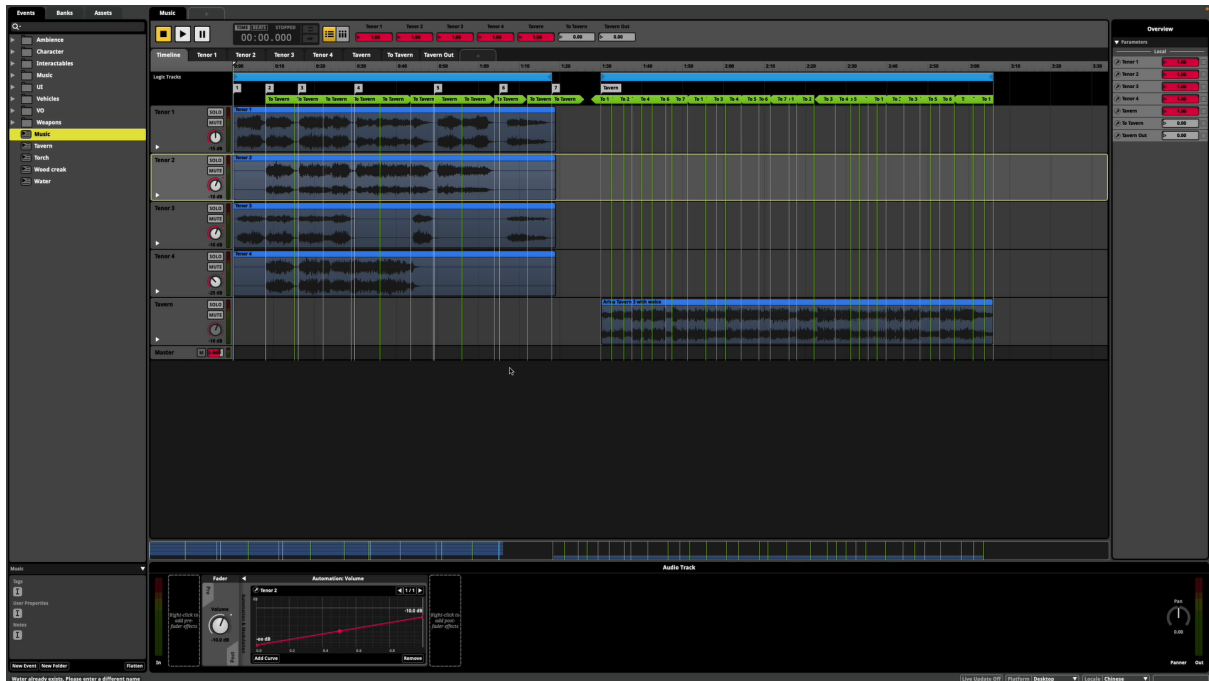


Fig. 28 FMOD Project of Artefact 3

As in previous games, the FMOD project was linked to the Unity project. It uses 3D transparent objects to indicate zones with different parameters and as a result with different music (the detailed algorithm for setting up the zones can be found in Appendix 2). One of the advantages of using medieval authentic music in games is that the lack of verticality makes it possible to combine music differently as well as start it from various places of the timeline (for instance, the landscape track has seven destination markers).

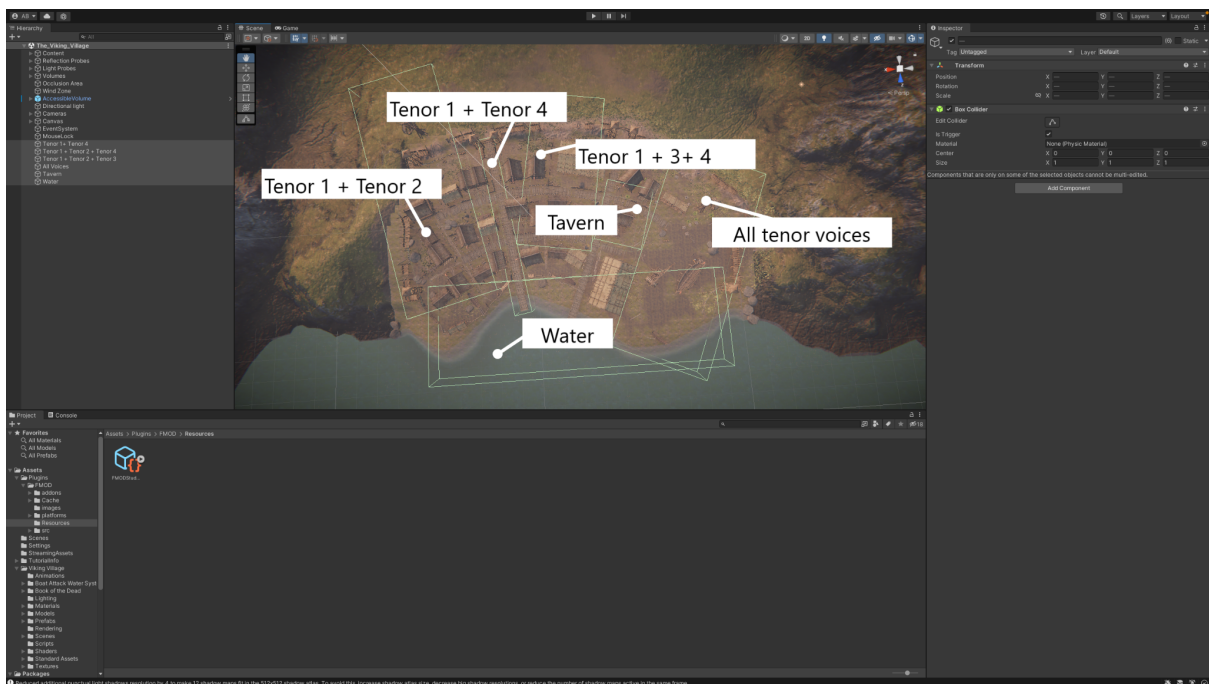


Fig. 29 Unity project for Artefact 3

5. Conclusion

In this project, music was composed to achieve a high level of medieval authenticity. This work explores both medieval compositional techniques and traditional scoring standards in orchestration, instrumentation, and harmonic progressions. The advantage of the project lies in its artefact: the music written for this project was implemented in the Viking Village video game which made it possible to compare different levels of authenticity used in videogame music.

Based on the research and analysis conducted in A1, this project explores the idea of writing historic accurate music compositions for interactive game worlds and shows that it is possible to achieve interactivity in a game with this music. This project has the potential for further research, for instance, exploring the idea of randomization in Gregorian chant with FMOD, measuring players' experience of a game set up in the Middle Ages with different levels of authenticity in soundtracks and so on.

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7. Appendix

Appendix 1:

J.S. Bach: Suite in E Minor, BWV 996 (Arr. for Guitar) - IV. Sarabande



Listen: <https://open.spotify.com/track/1LpBu9DMOmscT94Rbf2y2v?si=ceccbb1deef4dc2>

Appendix 2: Algorithm of the implementing music in a video game

1. Install FMOD for Unity.
2. Create FMOD Project and set up parameters needed for the game (for instance, MelodyIn parameters, loops and transitions).
3. Open Unity Project with a game and import FMOD for Unity package into the project.
4. Follow the instructions to replace Audio Engine with FMOD in Unity and link the FMOD project to the Unity project.
5. Build the FMOD project to Unity after any changes in the FMOD project.
6. Set up default music linked to a player by adding a component: FMOD Event with music from the FMOD project.
7. Create 3D projects, delete Mesh components to make them transparent, place them on the map and create a component - FMOD Parameter Trigger - for each of them.
8. Set up FMOD parameters for each 3D object.
9. Try the game with the music in the Unity project.
10. If everything is set up, build a game.