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***COMPUTER MUSIC SYNTHESIS -
VARIATIONS
ON THE CHAT SONIFICATIONS OF
PROF. STEFAN TRAUSAN-MATU
AND VLADIMIR DIACONESCU***

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A SYSTEM FOR SONIFICATION OF CHAT CONVERSATIONS

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Rezumat. Această lucrare prezintă sistemul MusicXML Creator care generează o reprezentare sonoră (o 'sonificare') a unei conversații chat plecând de la modelul polifonic introdus de al doilea autor. Compoziția muzicală rezultată scoate în evidență cum participanții interacționează și cum sunt schimbate subiectele de discuție. Scopul principal al lucrării este să prezinte cum sistemul software implementat materializează modelul și metoda de analiză polifonice ale conversațiilor chat în învățarea colaborativă sprijinită de calculator.

Abstract. This paper presents the MusicXML Creator software system that generates an audible representation (a 'sonification') of a chat conversation starting from the polyphonic model introduced by the second author. The obtained musical composition highlights how participants interact and how discussion topics are alternated. The main purpose of the paper is to present how the implemented software system materializes the polyphonic model and analysis method of Computer-Supported Collaborative Learning chat conversations.

Keywords: Sonification, Computer-Supported Collaborative Learning, polyphony, natural language processing, music composition, polyphonic model, discourse analysis

1. Introduction

This paper presents the development of a software system that generates an audible representation (a 'sonification') of a chat conversation starting from the polyphonic model. The musical composition obtained highlights how participants interact and how discussion topics are alternated.

The main purpose of the paper is to present how the implemented software system materializes the polyphonic model and analysis method of Computer-Supported Collaborative Learning (CSCL) instant messenger (chat) conversations [1, 2]. The polyphonic model considers that the analysis of the degree of contribution and collaboration in CSCL chats can be done starting from an analogy with

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polyphonic music, in which several threads (voices) enter in inter-animation processes along both the longitudinal (melodic) and the transversal (harmonic) dimensions. This process is driven by dissonances and consonances among voices that assure both coherence and novelty [1, 2, 3].

The polyphonic model is a novel discourse theory in text analysis. Starting from the theories of the Russian philosopher Mikhail Bakhtin [4], this model was created in order to offer a new perspective on understanding how knowledge is built in small groups, to enable the analyze of the interactions among people participating in a conversation and, in general, on how social processes are seen [5].

Probably the best example of polyphonic music is the fugue, as Johann Sebastian Bach mastered it. In fugues several voices follow diverse counterpoint procedures among one or multiple subjects [6]. Our polyphonic theory of knowledge construction in small groups [1, 2, 3, 5] is that successful CSCL conversations follow similar rules to counterpoint in polyphonic music. By sonification we aimed to prove the truth of our theory and the first results, obtained with the MusicXML Creator computer program, orchestrated by Professor Șerban Nichifor from the National University of Music in Bucharest confirmed our assumptions (listen for example to <http://www.youtube.com/watch?v=YfuKFdG7ymQ>).

The MusicXML Creator computer program was developed for generating a musical composition from a chat conversation. The resulting sonification illustrates how participants interact, how topics of conversation supersede one another, and whether those involved in the discussion contradict or agree on a specific matter. In other words, the sonification emphasizes inter-animation specific to collaborative knowledge construction.

In the next section we will present the algorithms for sonification. The MusicXML Creator computer program is presented in the third section of the paper. The fourth section contains

2. The sonification algorithms

In order to sonify chat conversations, that means, to generate a polyphonic musical piece starting from a chat conversation, several problems should be solved: how to allocate notes to the elements of chats, how voices are allocated to instruments, what is the duration of each note and of rests, and how polyphony is achieved.

For note allocation, we considered two possibilities:

- each participant is a musical note
 - selected keywords from the conversation are musical notes.
-

The musical instruments that will play the generated song are selected at user's preference. The association of voices to instruments is also left at user's choice. Consequently, chat sonification will result in a musical composition with one (on which several voices are played) or with more musical instruments (each instrument being associated to a voice). For each case above mentioned we developed a separate algorithm, the motivation being that for a musical composition with several instruments there must be a different staff filled in simultaneously for each instrument, which makes it difficult to synchronize.

In both cases of note allocation, the duration of a note is determined based on the length of the utterance. In our MusicXML system, the minimum duration of a note is the hundred twenty-eighth note. We chose as minimum duration semiquavers and considered other values as almost imperceptible to the ear.

2.1 The algorithm for the case with one instrument

For computing the duration of a note, we initially considered the interval [minimum length, maximum length] of an utterance, which we divided into 32 equal parts. If the length of the utterance belongs to the first interval, it will be associated with a semiquaver. If it doesn't belong to this range, there will be a new division into 16 equal parts. If it belongs to the first new interval obtained, it will be associated with a quaver. Repeating this step, we reduce the degree of division from 16 to 8, then 4 etc. By reducing the number of divisions, dividing by a factor of 2, the duration of the note is multiplied by the same factor.

We consider this initial form of the algorithm not entirely satisfactory for us because if a person has the habit of talking more, she will be associated with notes with longer duration. For this reason, we have taken the average length of an utterance, and we have taken into account two initial intervals: [minimum length, average length] and [average length, maximum length]. Considering that we wanted the duration of a note to be one of semiquavers, quavers, quarters, minims and semibreves, we chose as average value of them the quarter, which is associated with an interval adjacent to the average length utterance.

We have further changed the way we calculated the length of an utterance after we had noticed the use of emoticons and repeated dots. Therefore, for a more precise calculation of the length of lines (words that are actually used), we considered only the number of alphanumeric characters.

The duration of musical rests is determined by the length of the time elapsed between two utterances. To determine this, we began with a similar "logarithmic" approach to the one used to determine the length of the notes.

There are moments during a conversation in which participants expect a new person to join the chat. These waiting periods strongly influence the values of all the rests that are going to be added to the song. Thus, we changed the initial approach in order to take into account the average response time and standard deviation (σ) of the response time between utterances. However, there were situations where these intervals overlapped due to the high standard deviation. Given that the frequency of notes with long durations was low, we decided to stop using standard deviation and put emphasis on their average.

The next step is to group the sequence of notes and rests into beats. The beat chosen to create the song is 4/4 (equivalent to a semibreve), commonly used in musical compositions.

When the duration of a note is too long compared to the remainder of the beat, it is divided into notes of shorter length, some remaining in the current beat, others being associated with the next beat. In this situation, we don't get the initially desired effect, to hear a single note of a given duration, but a series of notes identical to the original note having the sum of durations equal to the initial note's duration. When playing music, the notes are sung slightly discontinuous, giving the impression that there were several short utterances instead of a longer one. As a solution, we used a musical tie to continuously sing these notes. An alternative is a "legato", which has the same effect as linking music only used for binding different notes.

2.2 The algorithm for multiple instruments

Determining the duration of a note in the case of several instruments is done exactly as in the algorithm for a single instrument. Figure 1 shows a fragment of the musical composition obtained by applying the initial implementation of the algorithm, without overlapping instruments.



Fig. 1. Initial musical composition fragment

In the standard chat conversations there are not at least two utterances that overlap in terms of the time they were written at. This type of composition is not polyphonic because it does not contain melodies occurring at the same time, it does not have neither chords. The resulting composition sounds monotone and discontinuous.

To obtain a contrapuntal composition we must synchronize differently overlapping notes belonging to different instruments. When a person makes a reply to an utterance belonging to the same person, the rest between notes is smaller. In this case it is necessary to calculate the following new values : minimum time, maximum time and average time for the response time between utterances belonging to different participants.

Thus, we overlap more notes belonging to different instruments, if the response times between utterances belonging to different participants are less than the average response time between the utterances of different people. If not, musical instruments are synchronized by adding rests to the current maximum total duration of musical elements for an instrument. Whether or not the notes are overlapped, the instruments are then synchronized. Before adding new notes, we need to decide whether to add some rests due to a big response time between the current utterances.

If we want to track in our sonification how certain keywords are used and not to follow participants and if the utterance contains several keywords then associated notes are directly overlapped. Using this method of synchronization between musical instruments, we obtained the fragment shown in Figure 2.



Fig. 2. Musical composition fragment with overlapping instruments

This type of composition is not polyphonic because it does not contain melodies occurring at the same time. The resulting composition sounds monotone and discontinuous. To obtain a contrapuntal composition we must further synchronize differently overlapping notes belonging to different instruments.

When a person makes a reply to an utterance belonging to the same person, the rest between notes is smaller. In this case it is necessary to calculate the following new values : minimum time, maximum time and average time for the response time between utterances belonging to different participants.

If the response times between utterances belonging to different participants are less than the average response time between utterances made by different people we overlap more notes belonging to different instruments. If not, musical instruments are synchronized by adding rests to the current maximum total duration of musical elements for an instrument. Whether or not the notes are overlapped, the instruments are then synchronized. Before adding new notes, we need to decide whether to add some rests due to a big response time between the current utterances.

3. The MusicXml Creator System

This section introduces the MusicXml Creator system, its structure, the graphical interface presentation, describing the format of the input files and output mode of association between chat elements and musical elements specific to Music XML format.

The diagram in Figure 3 shows the architecture of the system. It receives an XML file as input (see Figure 4 for an excerpt of such a file). As mentioned in the previous section, the user has the possibility to choose between two combinations: each participant is a musical note or selected keywords are musical note, and musical instruments that will play that song.

The main module takes the input file and parses it using an XML Parser. After this, the natural language text in each utterance of the conversation is processed using a set of modules provided by the Stanford CoreNLP package. Resulting data is stored in the Chat Model (<http://www-nlp.stanford.edu/software/>).

Data is further taken from the main module and, depending on the selection made in the graphical interface, the appropriate algorithm is called, which sets the duration of the selected notes, their sequence and adds rests where necessary. Finally, notes are grouped into beats and sent back to the main module. This transmits all data received to the writing module, which generates a Music XML file with the appropriate structure, representing the output file (see Section 3.2).

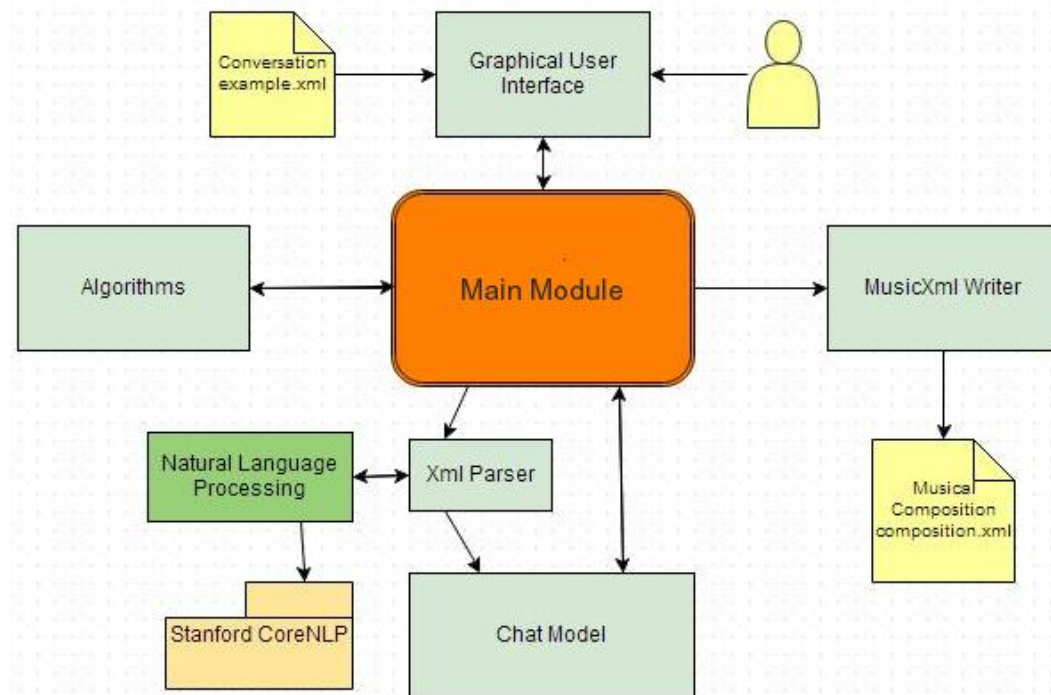


Fig. 3. MusicXml Creator architecture

The application input file containing the conversation that is intended to be parsed is an XML file with the structure shown in Figure 4. The participants in the conversation are defined in the beginning of the file. Each individual is characterized by a name (nickname) that is used throughout the conversation.

An utterance is characterized by:

- The participant who emitted it;
- Unique ID (genid);
- The moment when it was emitted (time);
- The utterance's ID to which reference is made in the text (ref);
- The content of the utterance.

A new person is introduced to the conversation through a line containing the text "joins the room". And when it leaves the conversation, the line will contain the text "leaves the room". If an utterance is not a reply to a previous utterance in the conversation, the "ref" field will be equal to 0.



```
<Dialog team="2" file="echipa2.xml">
  <Participants>
    <Person nickname="Liviu"/>
    <Person nickname="Alex"/>
  </Participants>
  <Topics/>
  <Body>
    <Turn nickname="Liviu">
      <Utterance genid="1" time="03:05:23" ref="0">joins the room</Utterance>
    </Turn>
    <Turn nickname="Alex">
      <Utterance genid="2" time="03:22:56" ref="5">joins the room</Utterance>
    </Turn>
    <Turn nickname="Liviu">
      <Utterance genid="3" time="03:09:05" ref="0">Hey Alex let's make a xml chat example</Utterance>
    </Turn>
    <Turn nickname="Alex">
      <Utterance genid="4" time="03:57:10" ref="3">ok</Utterance>
    </Turn>
    <Turn nickname="Liviu">
      <Utterance genid="5" time="03:57:29" ref="0">Finished</Utterance>
    </Turn>
    <Turn nickname="Alex">
      <Utterance genid="6" time="03:57:54" ref="0">leaves the room</Utterance>
    </Turn>
    <Turn nickname="Liviu">
      <Utterance genid="7" time="03:57:54" ref="0">leaves the room</Utterance>
    </Turn>
  </Body>
</Dialog>
```

Fig. 4. Example of an XML input file

3.1 The graphical interface presentation

In the graphical interface, the visual elements are placed in such a way that the user can quickly figure out how to work with it (see Figure 5).

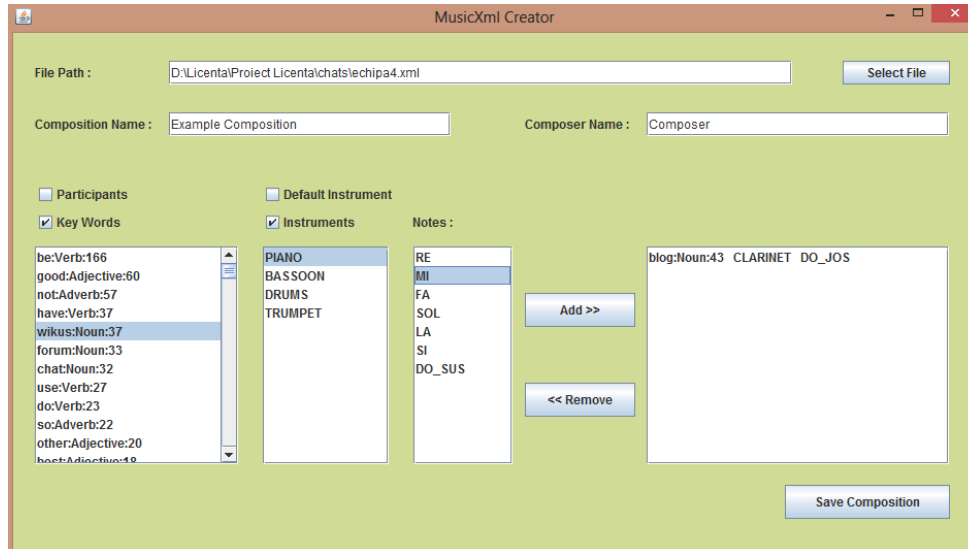


Fig. 5. Graphical User Interface for MusicXml Creator

Once the input file is selected, the list of keywords or the list of participants to be populated are displayed, depending on the user's choice.

To change the display list corresponding to the first column, uncheck the selected option or select another option (selection of participants or keywords). The second column represents the choice of instruments to be used in playing the resulting song. If "Default Tool" is chosen then all associations will point to piano. The third column lists the musical notes available that can associate a keyword or a participant.

3.3 The MusicXML file obtained

The structure of the MusicXML file created deals with two aspects:

- the visual aspect, which includes the way musical elements, staves, composer's name and the composition's title are arranged (Figure 6);
- the sound aspect, represented by the encoding of musical elements (Figure 7 and Figure 8).

```

<identification>
  <encoding>
    <software>MusicXml Creator</software>
    <supports attribute="new-system" element="print" type="yes" value="yes"/>
    <supports attribute="new-page" element="print" type="yes" value="yes"/>
  </encoding>
</identification>
<defaults>
  <scaling>
    <millimeters>7.2319</millimeters>
    <tenths>40</tenths>
  </scaling>
  <page-layout>
    <page-height>1545</page-height>
    <page-width>1194</page-width>
  </page-layout>
</defaults>
<credit page="1">
  <credit-words default-x="600" default-y="1490" font-size="24" justify="center" valign="top">Multi-instrument Composition</credit-words>
</credit>
<credit page="1">
  <credit-words default-x="1125" default-y="1410" font-size="12" justify="right" valign="top">Calinescu Alexandru</credit-words>
</credit>

```

Fig. 6. Fragment of created MusicXML file – visual aspect

It can be observed that we used the node "identification" to highlight features of the software that helped create the file. The next node is used to set the parameters related to the size of the page, thus facilitating the eventual printing of the musical composition, and, finally, the nodes "credit" used to set a name and author of the composition.

Music XML file structure related to the sound is based on two main nodes:

1) "Part-list", which includes a listing of all the instruments and their association with corresponding parts. An instrument is represented by a node "score-part" having the structure shown in Figure 7.

```

<score-part id="P1">
  <part-name print-object="yes">Piano</part-name>
  <score-instrument id="P1-I1">
    <instrument-name>None</instrument-name>
  </score-instrument>
  <midi-instrument id="P1-I1">
    <midi-channel>1</midi-channel>
    <midi-program>1</midi-program>
    <volume>80</volume>
    <pan>0</pan>
  </midi-instrument>
</score-part>

```

Fig. 7. Fragment of created MusicXML file – defining musical instruments

It can be seen that each instrument is characterized by a part id (id = "P1"), a midi instrument id seen as an independent musical device for the MIDI protocol used for song playback, an unique channel playback (midi-channel), an inner coding id instrument and traits related to the sound produced by the instrument.

2) "Part", which contains the score associated with an instrument. This includes a list of nodes "measure" as a beat which in turn, contains a list of nodes "notes" that represent a note or a musical rest. The structure of a "note" node is shown in Fig. 3.8.

```
<note>
  <rest measure="yes"/>
  <duration>64</duration>
  <voice>1</voice>
</note>
<note>
  <pitch>
    <step>C</step>
    <octave>5</octave>
  </pitch>
  <duration>8</duration>
  <voice>1</voice>
  <type>16th</type>
  <stem>down</stem>
</note>
```

Fig. 8. Fragment of created MusicXML file – defining musical elements

The first "note" node represents a musical rest with the second one representing a musical note. A common feature of the two notes is their duration (the notes differ because of the concept of octave). Other features are: the position of the element in the octave, duration in units, type and how the way to draw the note. A unit is associated with a hundred twenty-eighth note.

4. Testing and evaluation

In order to test the application, we used music arrangements that include notes of counterpoint compositions. These are characterized by original notes and cadences given in Table 4.1.

Mode	Initial Mode	Frequent Cadence
Dorian	Re, La	Re, La, Fa
Phrygian	Mi, La, Si	Mi, La, Sol
Lydian	Fa, Do	Fa, Do
Mixolydian	Sol, Re	Sol, Re, Do
Aeolian	La, Mi	La, Re, Do
Ionian	Do, Sol	Do, Sol, La

Table 1. Musical Modes

The choice of the music arrangements has been made in order for the resulting composition to sound as harmonic as possible. To illustrate rhythmic response of two participants in a conversation we used notes from the Lydian mode (Figure 9)

Lydian-participant

Calinescu Alex

Piano

6

12

Fig. 9. Musical composition fragment – selected participant, Lydian mode

The yellow highlighting indicates a sequence of utterances belonging to the participant who has been associated with the note “Fa”. The brown highlighting contains a series of utterances belonging to the participant who has been associated with the note “Do”. The green highlighting indicates the alternation of utterances of participants, suggesting a communication of "request-response".

To generate a sonification that allows analyzing the interactions of keywords in the conversation, in the example shown in Figure 10, we chose a musical arrangement of notes used in the Phrygian mode. We can see a frequent usage of keywords in several fragments, which usually imply that the topic of discussion is prompted by the word. We associated the note “Mi” with the keyword "chat", topic highlighted by the green box and the note “La” with the keyword "forum".



Fig. 10. Musical composition fragment – keywords selection, Phrygian mode

In order to observe the usage of certain words in a conversation (in a negative or positive context), in the example in Figure 11, we associate the adverb "not" with the note "Do", the verb "agree" with the note "Sol" and the adjective "good" with the note "La". The green box highlights when there is a dispute between participants.



Fig.11. Musical composition fragment – highlighting positive and negative context

The above examples were made choosing "Default Instrument", seeking harmony of sounds made by the chosen music arrangements and the repetitive fragments in order to determine the existence of patterns in the way participants interact or in the way they alternate topics.

With the musical composition played by many instruments we want to analyze how they overlap in order to understand which topics are discussed at a certain point in time or how the participants are involved. The overlap of instruments is represented by a red line in the example shown in Figure 12.

Arpeggio-keywords

Calinescu Alex

Fig. 12. Musical composition fragment – overlapping instruments

In the following example we have highlighted a fragment where a participant is not sufficiently engaged in the conversation, preferring to follow what others discuss. This participant is associated with the trumpet instrument, and his period of inactivity is evidenced by the series of rests in the green box (Figure 13).

Aeolian-participants

Calinescu Alex

Fig.13. Musical composition fragment – insufficient participant engagement

The fragment in Figure 14 shows the use of the words "good" and "yes" to which we associate the corresponding high-pitch notes, respectively top "Do" and "Si" and the use of the words "not" and "problem" to which we associate the bass notes, respectively bottom "Do" and "Re".



Fig. 14. Musical composition fragment – highlighting positive context

We can observe there is a staff area where the frequency of the word "good" is high. This fragment is played by an instrument which emphasizes the rhythm of participants when it comes to agreeing with the words of another colleague. In this case, the instrument that plays the note "Si" also has a low accompaniment from instruments assigned to stave one, three and four.

In terms of sound, in these situations it is advisable to associate positive words with instruments such as the clarinet and bassoon (which have a higher playback frequency range) and for those with negative aspect instruments such as drum or trumpet.

In all tests performed, we chose words that have a high frequency of usage. If we had used words with a low frequency of occurrence, we would not have obtained a musical composition representative for our study.

For a correct understanding of the rhythm of the conversation, it is advised to select all the participants. Musical compositions with several instruments have the advantage of the possibility of eliminating a participant or a word, by disabling an instrument.

Starting from the results generated by the system, an orchestration was performed by Professor Șerban Nichifor from the National University of Music in Bucharest and the resulted musical pieces were beyond our expectations, for example, the 3 Dances musical piece, which integrated three chat sonifications and can be listened at <http://www.youtube.com/watch?v=YfuKFdG7ymQ>.

5. Conclusions and future developments

The association between an utterance of a conversation and a musical note is difficult to implement; choosing the note depends on the message that is sent and the tone used, aspects that are difficult to extract from a chat conversation.

This application achieves its purpose based on the results obtained after a series of tests on chat conversations. Although the songs created are not masterpieces of art developed by composers and musicians, we believe that, for a person who does not have advanced musical knowledge, they actually seem to reflect the messages that are intended to be transmitted by those involved in the conversation.

In conclusion, an audio representation of a chat conversation is a complex process influenced by many factors that must be taken into account in order to get the most accurate rendering of ideas and moods of the participants. However, this does not prevent us to believe in a future "artistic maturity" of the computer, which will transform ordinary chat conversations into veritable symphonies of information.

Acknowledgements

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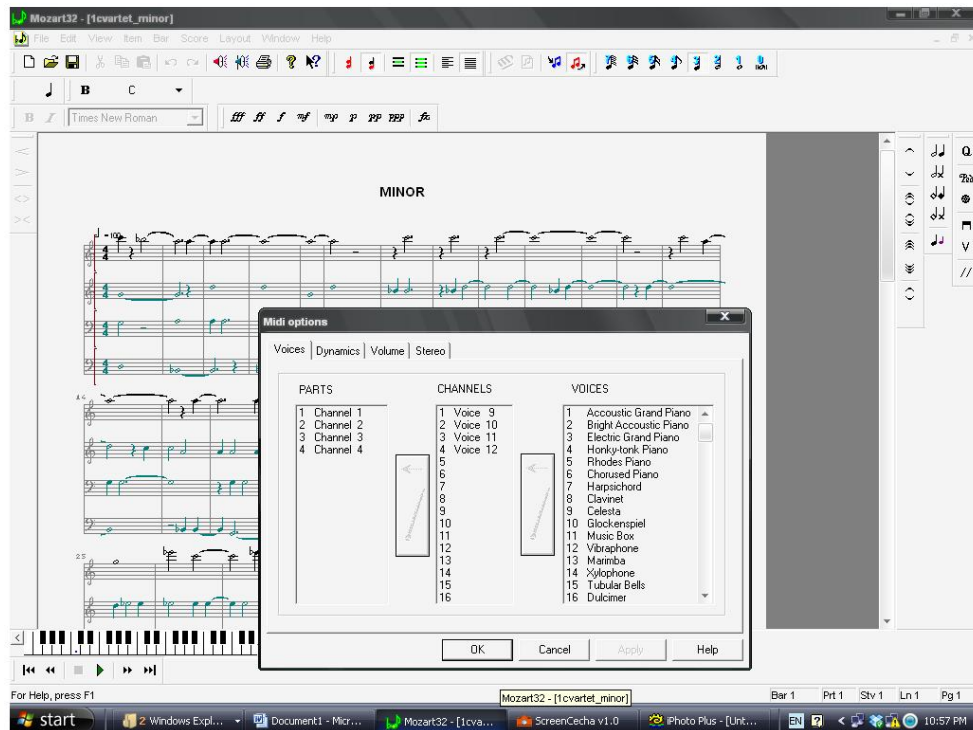


II. Serban NICHIFOR: THE MUSICAL DEVELOPMENT

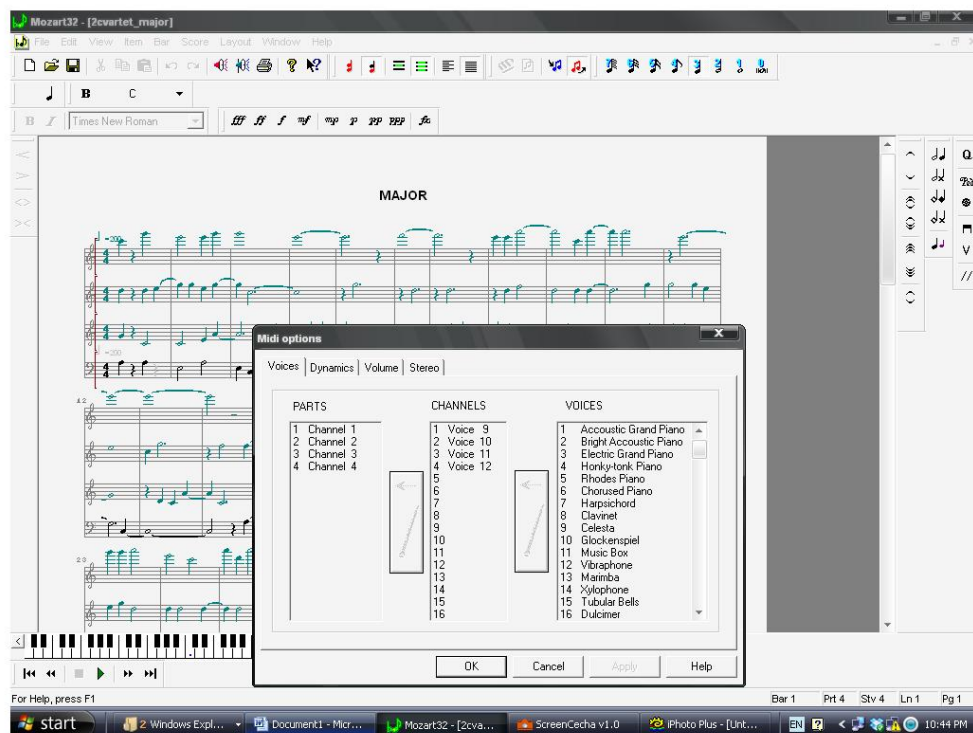
a.) MIDI ARRANGEMENT with

MOZART The Music Processor software (www.mozart.co.uk)

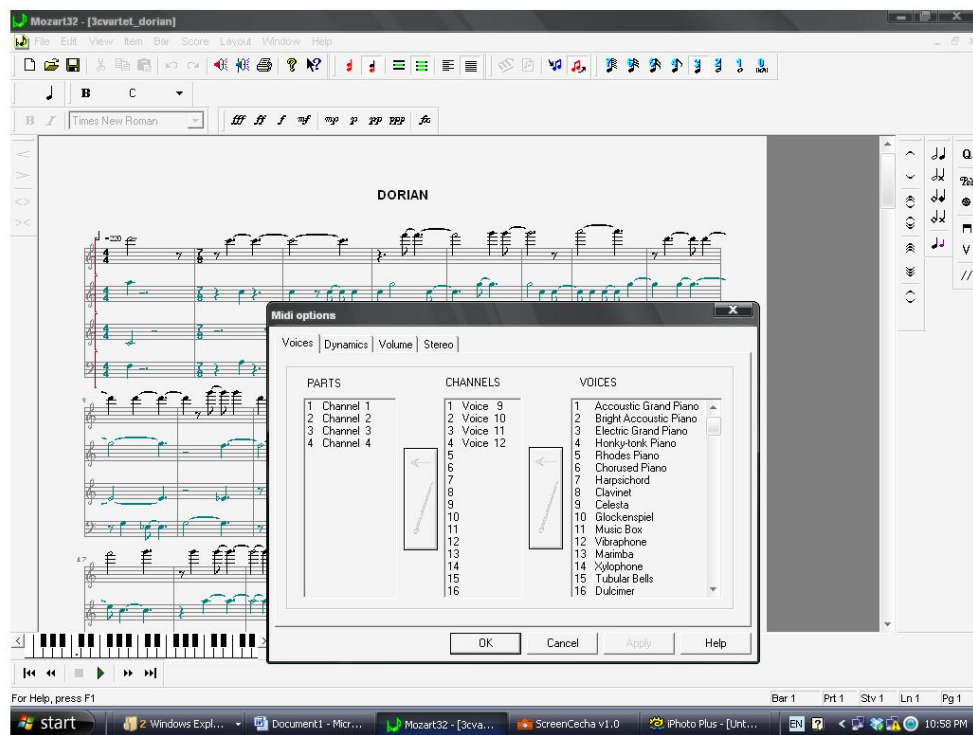
- 1.) MINOR



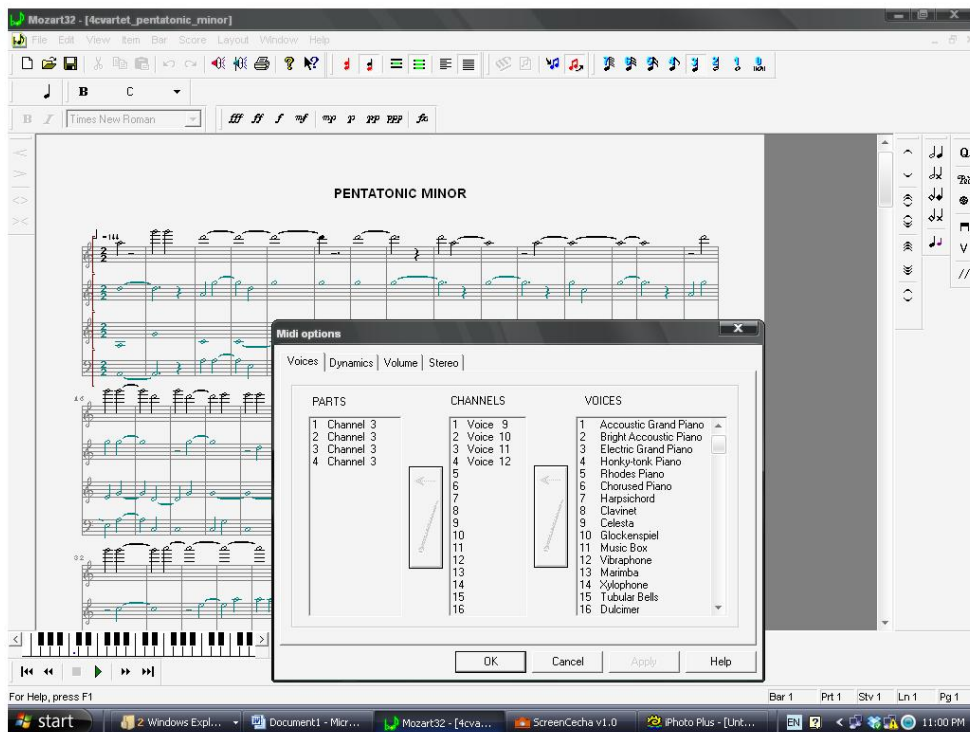
- 2.) MAJOR



- 3.) DORIAN



- 4.) PENTATONIC



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PENTATONIC MINOR

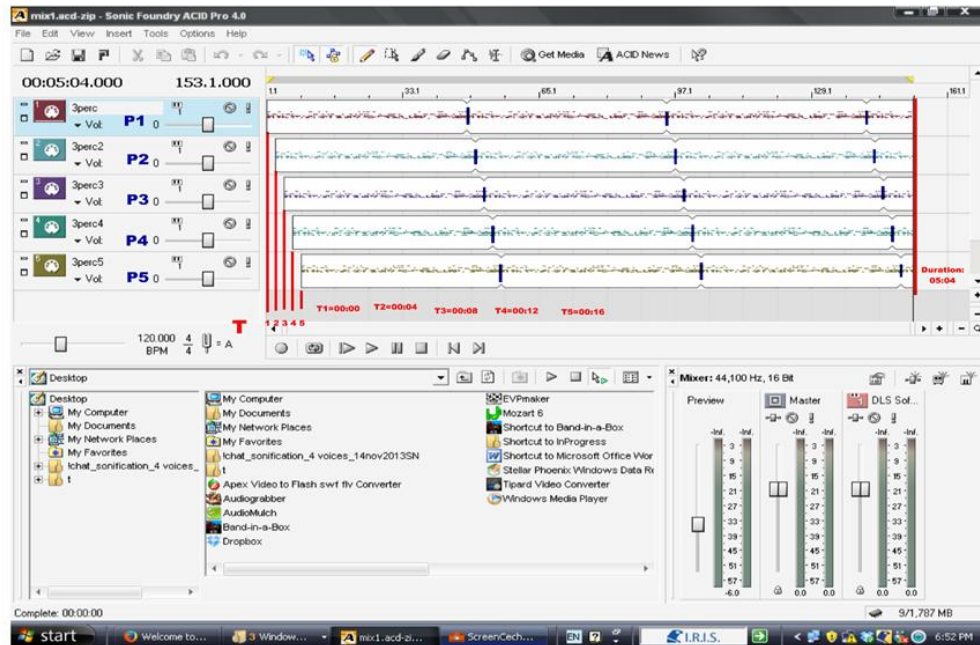
Measures 144-173 of the Pentatonic Minor piece. The score is written for a piano and features a complex, multi-layered texture. The right hand plays a series of rapid, ascending and descending runs, while the left hand provides a steady, rhythmic accompaniment. The music is characterized by its pentatonic scale, which gives it a unique, ethereal quality. The notation includes various musical symbols such as notes, rests, and dynamic markings, all arranged in a clear, professional layout.

Measures 174-193 of the Pentatonic Minor piece. This section continues the intricate musical composition, with the right hand maintaining its rapid, flowing lines and the left hand providing a consistent harmonic foundation. The use of the pentatonic scale is evident throughout, creating a sense of unity and coherence. The notation is precise and detailed, capturing the nuances of the performance.

b.) Serban NICHIFOR: MIXING with *ACID Xpress Free software*
<http://www.sonycreativesoftware.com/acidsoftware>)

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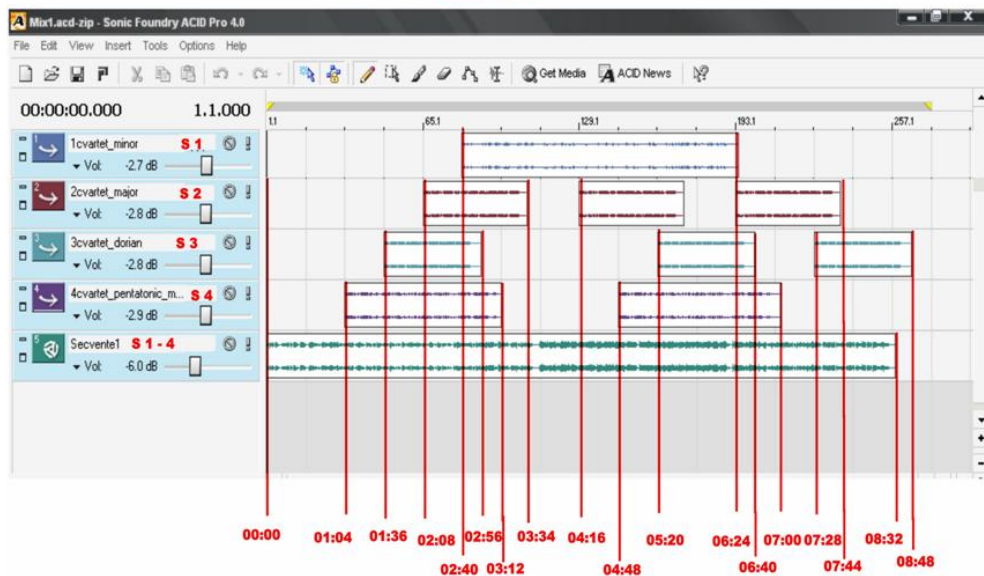
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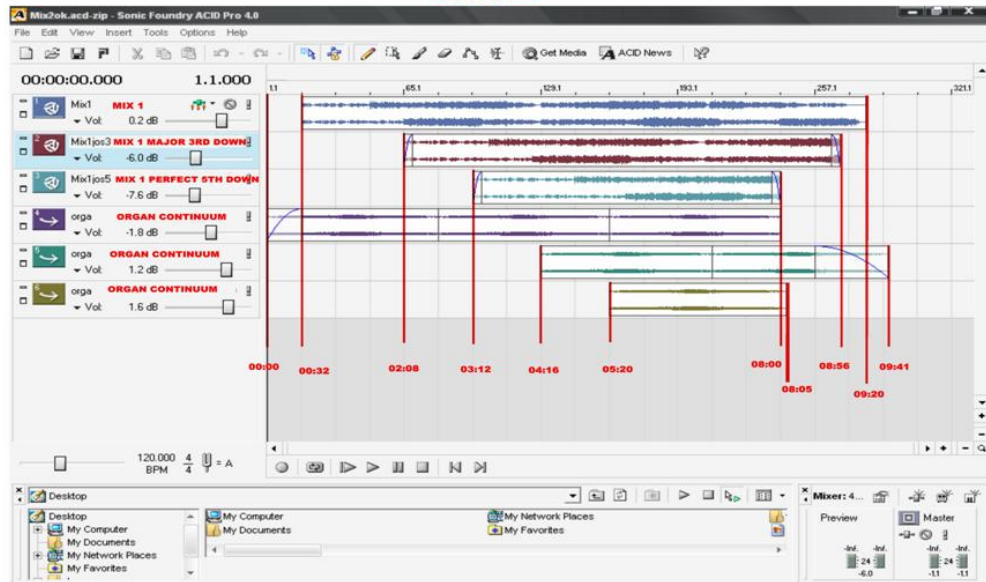
MIX 1



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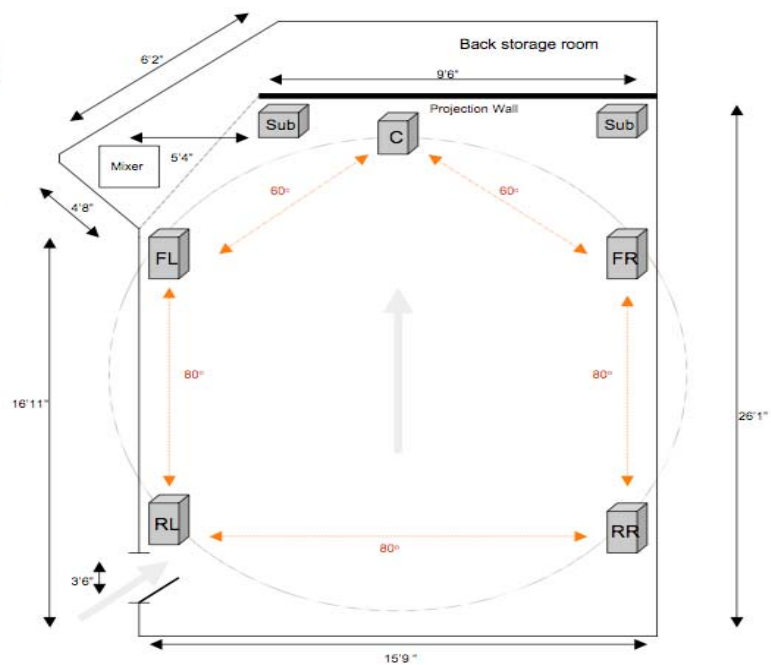
MIX 2



b.) SURROUND

HARVESTWORKS 5.1 Surround Sound And Video Screening Room

Note:
The two sub speakers are on one channel
The projector is mounted on the ceiling



I

3 DANCES

1

$\text{♩} = 60$

fff

fff

fff

fff

mp

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mp

System 1 of a musical score. It consists of five staves. The top staff is empty. The second staff contains a melodic line with eighth and sixteenth notes, including a triplet. The third and fourth staves are empty. The fifth staff contains a complex bass line with many beamed sixteenth notes and some triplets. The system is divided into three measures.

System 2 of a musical score. It consists of five staves. The top staff is empty. The second staff contains a melodic line with eighth and sixteenth notes. The third and fourth staves are empty. The fifth staff contains a complex bass line with many beamed sixteenth notes. The system is divided into two measures.

System 1 of a musical score. It consists of five staves. The top staff is a grand staff (treble and bass clef) with a key signature of two flats (B-flat and E-flat) and a common time signature. The second staff contains a melody with a half note, a quarter note, and a half note. The third staff is empty. The fourth staff contains a melody with a half note, a quarter note, and a half note. The fifth staff contains a complex, dense texture of many notes, likely representing a piano accompaniment or a multi-measure rest.

System 2 of a musical score. It consists of five staves. The top staff is a grand staff (treble and bass clef) with a key signature of two flats (B-flat and E-flat) and a common time signature. The second staff contains a melody with a half note, a quarter note, and a half note. The third staff is empty. The fourth staff contains a melody with a half note, a quarter note, and a half note. The fifth staff contains a complex, dense texture of many notes, likely representing a piano accompaniment or a multi-measure rest.

System 1 of a musical score. It consists of five staves. The top staff is a grand staff (treble and bass clef) with a whole rest. The second staff is a single treble clef staff with a melodic line starting on a whole note, followed by a half note, and then a quarter note. The third staff is a grand staff with a whole rest. The fourth staff is a single treble clef staff with a melodic line starting on a whole note, followed by a half note, and then a quarter note. The fifth staff is a grand staff with a complex, dense texture of chords and arpeggios, primarily in the bass register.

System 2 of a musical score. It consists of five staves. The top staff is a grand staff with a melodic line starting on a whole note, followed by a half note, and then a quarter note. The second staff is a single treble clef staff with a melodic line starting on a whole note, followed by a half note, and then a quarter note. The third staff is a grand staff with a whole rest. The fourth staff is a single treble clef staff with a melodic line starting on a whole note, followed by a half note, and then a quarter note. The fifth staff is a grand staff with a complex, dense texture of chords and arpeggios, primarily in the bass register.

System 1 of a musical score. It consists of five staves. The top staff is empty. The second staff has a single eighth note followed by a quarter rest. The third staff contains a melodic line with eighth and quarter notes, some beamed together, and a slur. The fourth staff is empty. The fifth staff is a bass line with a complex rhythmic pattern of eighth and sixteenth notes, including triplets and slurs. The key signature has two flats (B-flat and E-flat).

System 2 of a musical score. It consists of five staves. The top staff has a half note followed by a quarter rest. The second staff has a half note followed by a quarter rest. The third staff contains a melodic line with eighth and quarter notes, some beamed together, and a slur. The fourth staff has a half note followed by a quarter rest. The fifth staff is a bass line with a complex rhythmic pattern of eighth and sixteenth notes, including triplets and slurs. The key signature has two flats (B-flat and E-flat).

A musical score for the song 'The Rose Tree'. The score is written for four voices (Soprano, Alto, Tenor, Bass) and a piano accompaniment. The key signature is one flat (B-flat major or D minor), and the time signature is 4/4. The score is divided into two systems, each with a repeat sign at the beginning. The piano accompaniment is written in the bass clef and features a steady eighth-note pattern in the right hand and a more complex, syncopated pattern in the left hand. The vocal parts are written in the treble clef and feature a melody that is repeated in each system. The lyrics are written below the vocal parts.

The image displays a musical score for the song "The Rose Tree". It is a four-part setting, likely for voices or instruments, arranged in four staves. The music is written in a common time signature (C) and a key signature of one flat (B-flat). The melody is simple and folk-like, featuring a mix of eighth and quarter notes. The accompaniment consists of a steady bass line with chords, primarily using the left hand. The score is divided into two systems, each with two measures. The first system shows the beginning of the piece, and the second system shows the continuation of the melody and accompaniment.

System 1 of a musical score. It consists of five staves. The top staff has a treble clef and a key signature of two flats (B-flat and E-flat). It begins with a whole rest, followed by a quarter rest, then a half note G4, and a half note F#4. The second staff is empty. The third staff has a treble clef and a key signature of two flats. It begins with a quarter note G4, followed by a quarter rest, then a half note G4, and a half note F#4. The fourth staff has a treble clef and a key signature of two flats. It begins with a quarter note G4, followed by a quarter rest, then a half note G4, and a half note F#4. The fifth staff has a bass clef and a key signature of two flats. It contains a complex accompaniment of eighth and sixteenth notes, with a key signature change to one flat (B-flat) in the second measure.

System 2 of a musical score. It consists of five staves. The top staff has a treble clef and a key signature of two flats. It begins with a whole rest, followed by a quarter rest, then a half note G4, and a half note F#4. The second staff is empty. The third staff has a treble clef and a key signature of two flats. It begins with a quarter note G4, followed by a quarter rest, then a half note G4, and a half note F#4. The fourth staff has a treble clef and a key signature of two flats. It begins with a quarter note G4, followed by a quarter rest, then a half note G4, and a half note F#4. The fifth staff has a bass clef and a key signature of two flats. It contains a complex accompaniment of eighth and sixteenth notes, with a key signature change to one flat (B-flat) in the second measure.

System 1 of a musical score. It consists of five staves. The top staff has a treble clef and a key signature of one flat (B-flat). The second staff has a treble clef and a key signature of one flat. The third staff has a treble clef and a key signature of one flat. The fourth staff has a treble clef and a key signature of one flat. The fifth staff has a bass clef and a key signature of one flat. The music is written in 4/4 time. The first measure of the first staff contains a whole note B-flat. The second measure of the first staff contains a whole note B-flat. The first measure of the second staff contains a quarter rest, followed by a quarter note B-flat. The second measure of the second staff contains a quarter rest, followed by a quarter note B-flat. The first measure of the third staff contains a quarter rest, followed by a quarter note B-flat. The second measure of the third staff contains a quarter rest, followed by a quarter note B-flat. The first measure of the fourth staff contains a quarter rest, followed by a quarter note B-flat. The second measure of the fourth staff contains a quarter rest, followed by a quarter note B-flat. The first measure of the fifth staff contains a quarter rest, followed by a quarter note B-flat. The second measure of the fifth staff contains a quarter rest, followed by a quarter note B-flat.

System 2 of a musical score. It consists of five staves. The top staff has a treble clef and a key signature of one flat (B-flat). The second staff has a treble clef and a key signature of one flat. The third staff has a treble clef and a key signature of one flat. The fourth staff has a treble clef and a key signature of one flat. The fifth staff has a bass clef and a key signature of one flat. The music is written in 4/4 time. The first measure of the first staff contains a quarter note B-flat, followed by a quarter note B-flat. The second measure of the first staff contains a quarter note B-flat, followed by a quarter note B-flat. The first measure of the second staff contains a quarter rest, followed by a quarter note B-flat. The second measure of the second staff contains a quarter rest, followed by a quarter note B-flat. The first measure of the third staff contains a quarter rest, followed by a quarter note B-flat. The second measure of the third staff contains a quarter rest, followed by a quarter note B-flat. The first measure of the fourth staff contains a quarter rest, followed by a quarter note B-flat. The second measure of the fourth staff contains a quarter rest, followed by a quarter note B-flat. The first measure of the fifth staff contains a quarter rest, followed by a quarter note B-flat. The second measure of the fifth staff contains a quarter rest, followed by a quarter note B-flat.

First system of a musical score. It consists of five staves. The top staff has a single note with a fermata. The second staff contains a melodic line with eighth and sixteenth notes. The third staff is empty. The fourth staff contains a melodic line with eighth and sixteenth notes. The fifth staff is a complex piano accompaniment with many beamed sixteenth notes in both hands. The system is divided into two measures by a vertical bar line.

Second system of a musical score, continuing from the first. It also consists of five staves. The top staff is empty. The second staff is empty. The third staff is empty. The fourth staff contains a melodic line with eighth and sixteenth notes. The fifth staff is a complex piano accompaniment with many beamed sixteenth notes in both hands. The system is divided into two measures by a vertical bar line.

System 1 of a musical score. It consists of six staves. The top three staves (treble clef) show sparse melodic lines with rests. The bottom three staves (bass clef) feature a dense, rhythmic accompaniment with many beamed sixteenth notes. The key signature has two flats (B-flat and E-flat), and the time signature is 4/4. The system is divided into two measures by a vertical bar line.

System 2 of a musical score, continuing from the first system. It also consists of six staves. The melodic lines in the top three staves are more active, with some eighth and sixteenth notes. The bass accompaniment remains dense and rhythmic. The key signature and time signature are consistent with the first system. The system is divided into two measures by a vertical bar line.

This musical score consists of six staves. The top five staves are for a voice part, and the bottom staff is for a piano accompaniment. The key signature has two flats (B-flat and E-flat), and the time signature is 3/4. The score is divided into two measures by a vertical bar line. In the first measure, the voice staves contain various melodic lines with notes, rests, and slurs. The piano accompaniment features a complex, rhythmic pattern of chords and single notes. In the second measure, the voice staves continue their melodic development, with some notes beamed together. The piano accompaniment maintains its complex texture, with some changes in the lower register. The score ends with a double bar line at the end of the second measure.

2

$\text{♩} = 80$

The musical score is written for a piece marked '2' with a tempo of 80. It is in 4/4 time and consists of three systems of four staves each. The first system includes a treble and bass staff with a 'fff' dynamic marking. The second and third systems continue the piece with various musical notations including notes, rests, and slurs.

♩ = 70 ♩ = 60 ♩ = 50 ♩ = 30

mix1.acd.zip - Sonic Foundry ACID Pro 4.0

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T1=00:00 T2=00:04 T3=00:08 T4=00:12 T5=00:16

Duration: 05:04

Desktop

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Apex Video to Flash swf flv Converter

AudioGrabber

AudioMulch

Band-in-a-Box

Dropbox

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Mozart 6

Shortcut to Band-in-a-Box

Shortcut to InProgress

Shortcut to Microsoft Office Wor

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Tipard Video Converter

Windows Media Player

Mixer: 44,100 Hz, 16 Bit

Preview

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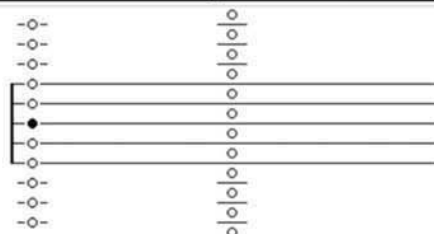
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Percussion instruments of indefinite pitch

Instrument	MIDI	MIDI +	MIDI -
"Snare drum 1"	Acoustic Snare	Rim shot	
"Snare drum 2"	Electric Snare	Rim shot	
"Tom-tom (high)"	High Tom	Rim shot	
"Tom-tom (high-mid)"	Hi-Mid Tom	Rim shot	
"Tom-tom (low-mid)"	Low-Mid Tom	Rim shot	
"Tom-tom (low)"	Low Tom	Rim shot	
"Tom-tom (high floor)"	High Floor Tom	Rim shot	
"Tom-tom (low floor)"	Low Floor Tom	Rim shot	
"Bass drum 1"	Bass Drum 1		
"Bass drum 2"	Acoustic Bass Drum		
"Timbale (high)"	High Timbale	Rim shot	
"Timbale (low)"	Low Timbale	Rim shot	
"Bongo (high)"	Hi Bongo		
"Bongo (low)"	Low Bongo		
"Conga (high)"	Open Hi Conga	Mute Hi Conga	
"Conga (low)"	Low Conga	Mute Hi Conga	
"Cuica"	Open Cuica	Mute Cuica	
"Sudro (open)"	Open Sudro		
"Sudro (mute)"	Mute Sudro		
"Hi-hat cymbal"	Open Hi Hat	Closed Hi Hat	Pedal Hi Hat
"Crash cymbal 1"	Crash Cymbal 1		
"Crash cymbal 2"	Crash Cymbal 2		
"Splash cymbal"	Splash Cymbal		
"Ride cymbal 1"	Ride Cymbal 1		
"Ride cymbal 2"	Ride Cymbal 2		
"Chinese cymbal"	Chinese Cymbal		
"Triangle"	Open Triangle	Mute Triangle	
"Tambourine"	Tambourine		
"Ride bell"	Ride Bell		
"Small bell"	Small Bell		
"Cow bell"	Cow Bell		
"Sleigh bells"	Sleigh Bells		
"Bell tree"	Bell Tree		
"Agogo (high)"	High Agogo		
"Agogo (low)"	Low Agogo		

"Wood block (high)"	Hi Wood Block
"Wood block (low)"	Low Wood Block
"Claves"	Claves
"Castanets"	Castanets
"Maracas"	Maracas
"Cabasa"	Cabasa
"Sticks"	Sticks
"Guero (short)"	Short Guero
"Guero (long)"	Long Guero
"Shaker"	Shaker
"Hand Clap"	Hand Clap
"Guero (long)"	Long Guero
"Shaker"	Shaker
"Hand Clap"	Hand Clap
"Click 1"	Click 1
"Click 2"	Click 2
"Slap"	Slap
"Vibraslap"	Vibraslap
"High Q"	High Q
"Record scratch 1"	Record Scratch 1
"Record scratch 2"	Record Scratch 2
"Whistle (short)"	Short Whistle
"Whistle (long)"	Long Whistle

Percussion instrument assignments to stave



P

This musical score is for a piano (P) in 4/4 time. It consists of four staves. The first staff begins with a *fff* dynamic marking. The music features a variety of note values, including eighth, sixteenth, and thirty-second notes, as well as rests. The second staff also starts with a *fff* marking. The third and fourth staves continue the melodic and harmonic development. The score is written in a standard musical notation style with a key signature of one flat (Bb) and a common time signature of 4/4.

The image displays a musical score for four staves, organized into four systems. The notation is written in a standard musical staff format, featuring various notes, rests, and musical symbols. The first system consists of four staves with a mix of eighth and sixteenth notes, some beamed together, and several rests. The second system continues the melody and accompaniment, with more complex rhythmic patterns and some slurs. The third system shows a continuation of the musical themes, with some staves having longer note values. The fourth system concludes the piece, with a final cadence indicated by a double bar line. The overall style is that of a handwritten musical manuscript.

P1





P2



The first system of musical notation consists of four measures. The top staff (treble clef) begins with a whole rest, followed by a half note G4, a quarter note A4, and a quarter note B4. The bottom staff (bass clef) features a continuous eighth-note accompaniment: G3, A3, B3, C4, D4, E4, F4, G4. The key signature has one sharp (F#).

The second system of musical notation consists of four measures. The top staff continues with a half note C5, a quarter note B4, and a quarter note A4. The bottom staff continues with the eighth-note accompaniment. The key signature has one sharp (F#).

The third system of musical notation consists of four measures. The top staff begins with a half note G4, a quarter note F#4, and a quarter note E4. The bottom staff continues with the eighth-note accompaniment. The key signature has one sharp (F#).

The fourth system of musical notation consists of two measures. The top staff begins with a half note D4, a quarter note C4, and a quarter note B3. The bottom staff continues with the eighth-note accompaniment. The key signature has one sharp (F#).

P3



The first system of musical notation consists of four staves. The top staff is in treble clef with a key signature of two flats (B-flat and E-flat). It begins with a half rest, followed by a quarter note G4, a quarter rest, and a quarter note F4. The second staff is in bass clef and contains a series of eighth and sixteenth notes, including a triplet of eighth notes. The third staff is in bass clef and features a complex rhythmic pattern with many sixteenth and thirty-second notes. The fourth staff is in bass clef and contains a few notes, including a half note G2 and a quarter note F2.

The second system of musical notation consists of four staves. The top staff is in treble clef and contains a few notes, including a half note G4 and a quarter note F4. The second staff is in bass clef and contains a series of eighth and sixteenth notes. The third staff is in bass clef and features a complex rhythmic pattern with many sixteenth and thirty-second notes. The fourth staff is in bass clef and contains a few notes, including a half note G2 and a quarter note F2.

The third system of musical notation consists of four staves. The top staff is in treble clef and contains a few notes, including a half note G4 and a quarter note F4. The second staff is in bass clef and contains a series of eighth and sixteenth notes. The third staff is in bass clef and features a complex rhythmic pattern with many sixteenth and thirty-second notes. The fourth staff is in bass clef and contains a few notes, including a half note G2 and a quarter note F2.

The fourth system of musical notation consists of four staves. The top staff is in treble clef and contains a few notes, including a half note G4 and a quarter note F4. The second staff is in bass clef and contains a series of eighth and sixteenth notes. The third staff is in bass clef and features a complex rhythmic pattern with many sixteenth and thirty-second notes. The fourth staff is in bass clef and contains a few notes, including a half note G2 and a quarter note F2.



P4





P5

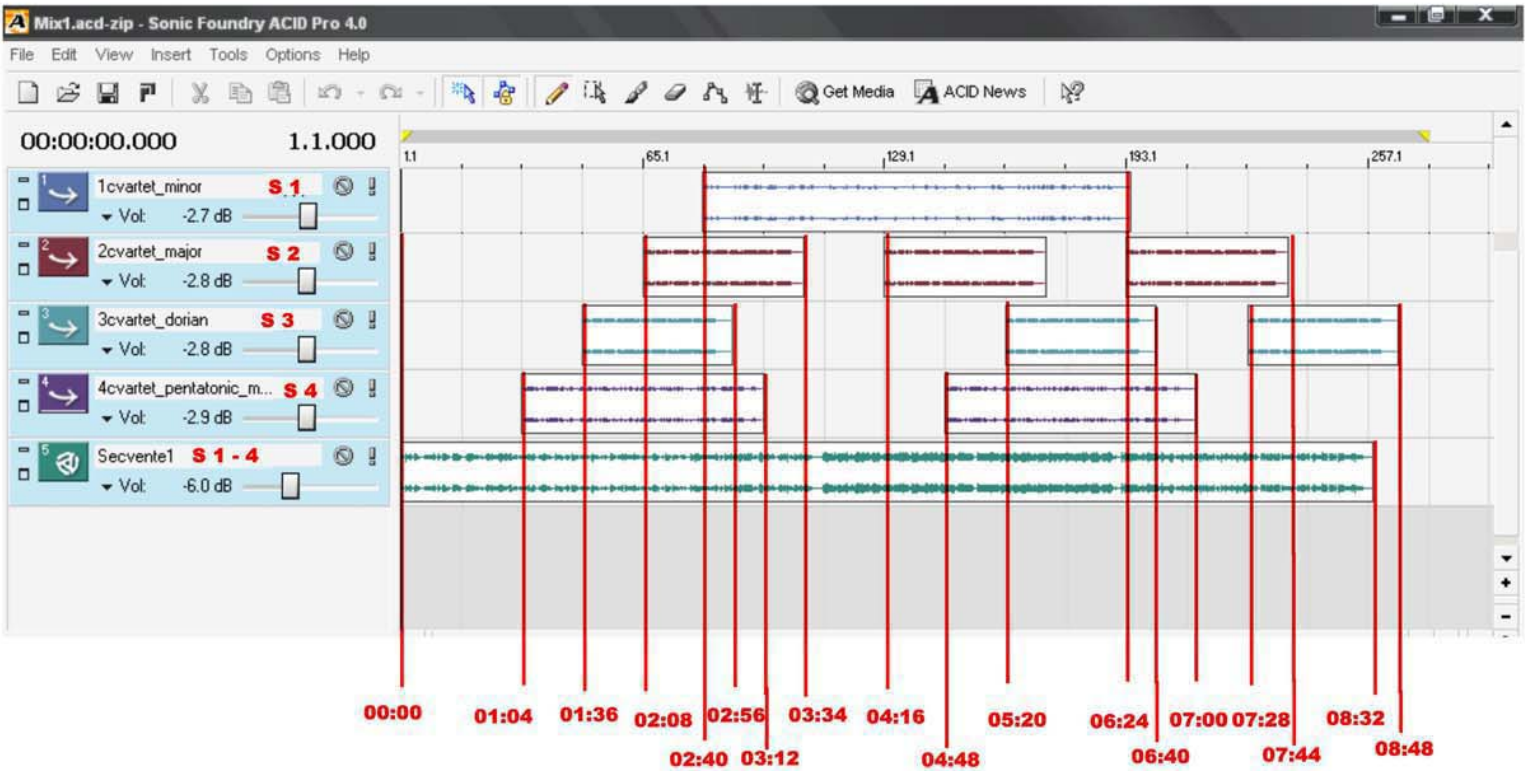
The musical score for P5 is written in a key of three flats (B-flat, E-flat, A-flat) and a 4/4 time signature. It consists of four systems, each containing four staves. The notation includes various musical symbols such as notes, rests, beams, and slurs, indicating a complex rhythmic and melodic structure. The first system begins with a treble clef and a key signature of three flats. The notation is dense, with many sixteenth and thirty-second notes, suggesting a fast tempo. The second system continues the melodic lines, with some staves featuring longer notes and rests. The third system shows a continuation of the rhythmic patterns, with some staves having more complex figures. The fourth system concludes the piece with a final cadence, marked by a double bar line and a key signature change to two flats (B-flat, E-flat).

The musical score is written for four parts in E-flat major (three flats) and 4/4 time. It consists of four systems of staves. The first system has four staves. The second system has four staves. The third system has four staves. The fourth system has four staves. The music features various rhythmic patterns, including eighth and sixteenth notes, and rests. The key signature has three flats (B-flat, E-flat, A-flat).

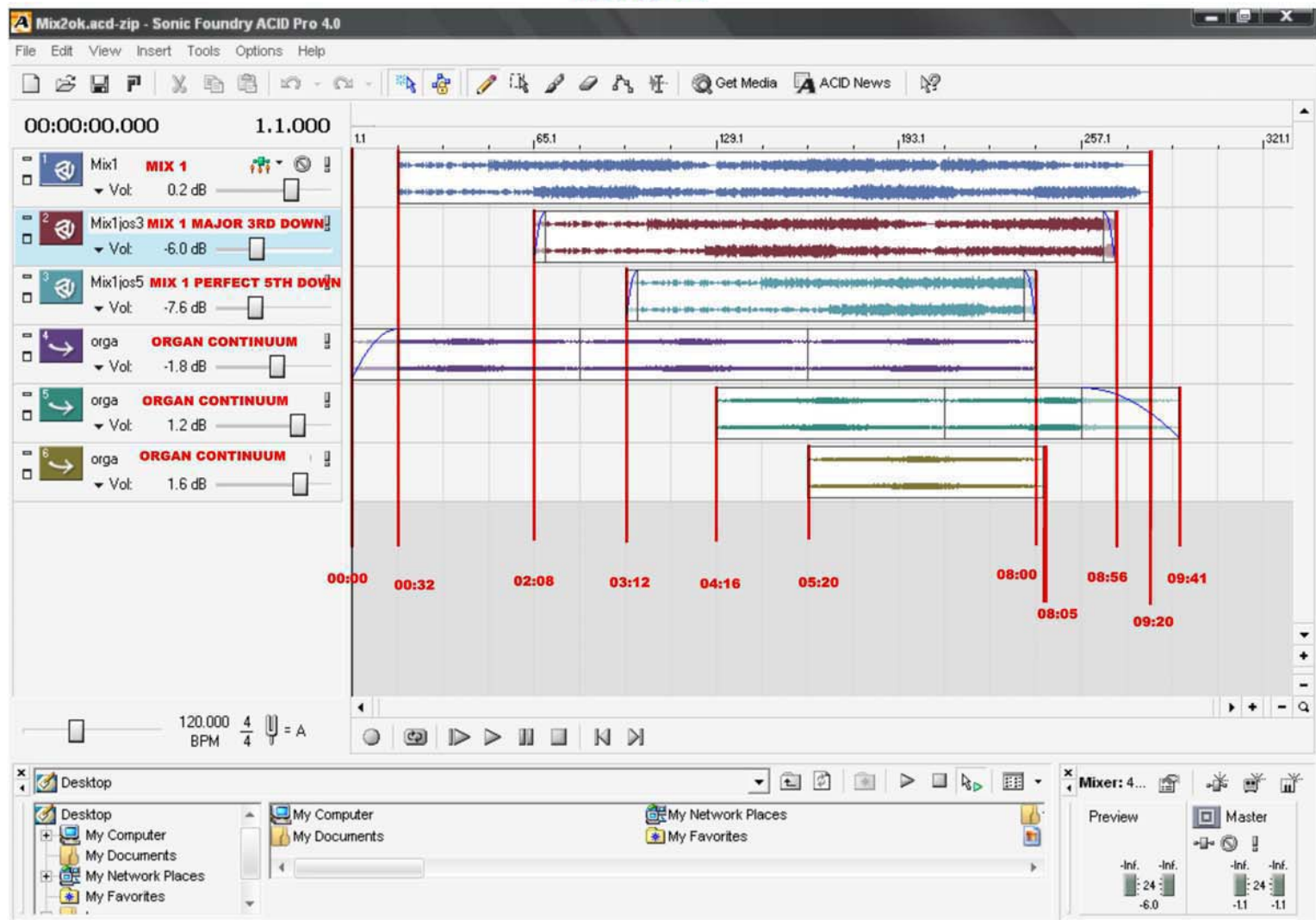
II

CORRESPONDENCES

MIX 1



MIX 2



S 1 - MINOR

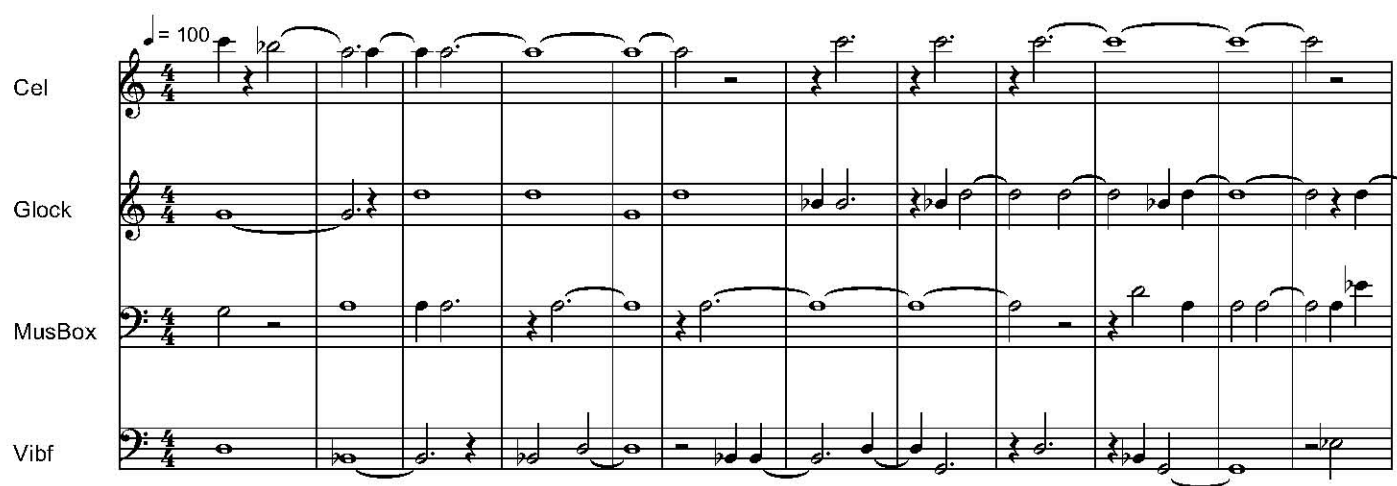
Cel

Glock

MusBox

Vibf

$\text{♩} = 100$



Cel

Glock

MusBox

Vibf

13



Cel

Glock

MusBox

Vibf

23



33

Cel

Glock

MusBox

Vibf

This system contains measures 33 through 43. The Cello (Cel) part is in the treble clef, featuring a melodic line with eighth and sixteenth notes, often beamed together. The Glockenspiel (Glock) part is also in the treble clef, playing a steady eighth-note pattern. The Music Box (MusBox) part is in the bass clef, with a melodic line consisting of half and quarter notes. The Vibraphone (Vibf) part is in the bass clef, playing a continuous eighth-note accompaniment.

44

Cel

Glock

MusBox

Vibf

This system contains measures 44 through 54. The Cello (Cel) part continues its melodic line with various note values and rests. The Glockenspiel (Glock) part maintains its eighth-note pattern. The Music Box (MusBox) part features a melodic line with some triplet-like groupings. The Vibraphone (Vibf) part continues with its eighth-note accompaniment.

56

Cel

Glock

MusBox

Vibf

This system contains measures 56 through 66. The Cello (Cel) part has a melodic line with some longer note values. The Glockenspiel (Glock) part continues with its eighth-note pattern. The Music Box (MusBox) part has a melodic line with some triplet-like groupings. The Vibraphone (Vibf) part continues with its eighth-note accompaniment.

67

Cel

Glock

MusBox

Vibf

78

Cel

Glock

MusBox

Vibf

89

Cel

Glock

MusBox

Vibf

S 2 - MAJOR

$\text{♩} = 200$

Cel

Glock

MusBox

Vibf

11

Cel

Glock

MusBox

Vibf

22

Cel

Glock

MusBox

Vibf

32

Cel

Glock

MusBox

Vibf

This system contains measures 32 through 41. The Cello (Cel) part features a melodic line with many beamed sixteenth notes. The Glockenspiel (Glock) part has a series of eighth notes. The Music Box (MusBox) part consists of a steady eighth-note pattern. The Vibraphone (Vibf) part provides a rhythmic foundation with a mix of eighth and sixteenth notes.

42

Cel

Glock

MusBox

Vibf

This system contains measures 42 through 51. The Cello (Cel) part continues its melodic line with beamed sixteenth notes. The Glockenspiel (Glock) part plays a sequence of eighth notes. The Music Box (MusBox) part maintains its eighth-note pattern. The Vibraphone (Vibf) part continues with a mix of eighth and sixteenth notes.

53

Cel

Glock

MusBox

Vibf

This system contains measures 53 through 62. The Cello (Cel) part continues its melodic line with beamed sixteenth notes. The Glockenspiel (Glock) part plays a sequence of eighth notes. The Music Box (MusBox) part maintains its eighth-note pattern. The Vibraphone (Vibf) part continues with a mix of eighth and sixteenth notes.

63

Cel

Glock

MusBox

Vibf

The musical score is written for four instruments: Cel (Cello), Glock (Glockenspiel), MusBox (Music Box), and Vibf (Vibraphone). The score consists of five measures. The Cel part begins with a whole rest in the first measure, followed by eighth-note chords in measures 2, 3, and 4, and a quarter note in measure 5. The Glock part begins with a half note in measure 1, a half note in measure 2, a quarter note in measure 3, a quarter note in measure 4, and a quarter note in measure 5. The MusBox part begins with a quarter note in measure 1, a quarter note in measure 2, a quarter note in measure 3, a quarter note in measure 4, and a quarter note in measure 5. The Vibf part begins with a half note in measure 1, a half note in measure 2, a quarter note in measure 3, a quarter note in measure 4, and a quarter note in measure 5.

S 3 - DORIAN

$\text{♩} = 220$

Cel

Glock

MusBox

Vibf

8

Cel

Glock

MusBox

Vibf

16

Cel

Glock

MusBox

Vibf

24

Cel

Glock

MusBox

Vibf

This system contains measures 24 through 31. The Cello (Cel) part features a melodic line with eighth and sixteenth notes, often beamed together. The Glockenspiel (Glock) part provides a rhythmic accompaniment with eighth notes. The Music Box (MusBox) part has a steady eighth-note pattern. The Vibraphone (Vibf) part plays a bass line with eighth and sixteenth notes.

32

Cel

Glock

MusBox

Vibf

This system contains measures 32 through 38. The Cello (Cel) part continues its melodic line. The Glockenspiel (Glock) part maintains its eighth-note accompaniment. The Music Box (MusBox) part continues with its eighth-note pattern. The Vibraphone (Vibf) part continues its bass line.

39

Cel

Glock

MusBox

Vibf

This system contains measures 39 through 45. The Cello (Cel) part continues its melodic line. The Glockenspiel (Glock) part maintains its eighth-note accompaniment. The Music Box (MusBox) part continues with its eighth-note pattern. The Vibraphone (Vibf) part continues its bass line.

46

Cel

Glock

MusBox

Vibf

This system contains measures 46 through 53. The Cello part features a melodic line with many beamed sixteenth notes and slurs. The Glockenspiel part has a similar rhythmic pattern with some rests. The Music Box part plays a steady eighth-note accompaniment. The Vibraphone part provides a harmonic foundation with a mix of eighth and sixteenth notes.

54

Cel

Glock

MusBox

Vibf

This system contains measures 54 through 60. The Cello part continues its melodic development with various slurs and ties. The Glockenspiel part has more frequent rests, allowing for a clearer melodic line. The Music Box part maintains its eighth-note accompaniment. The Vibraphone part continues with its rhythmic accompaniment.

61

Cel

Glock

MusBox

Vibf

This system contains measures 61 through 67. The Cello part shows more complex phrasing with multiple slurs. The Glockenspiel part has a more active role with fewer rests. The Music Box part continues its accompaniment. The Vibraphone part provides a consistent harmonic and rhythmic support.

68

Cel

Glock

MusBox

Vibf

75

Cel

Glock

MusBox

Vibf

06 - PENTATONIC MINOR

$\text{♩} = 144$

Cel

Glock

MusBox

Vibf

15

Cel

Glock

MusBox

Vibf

30

Cel

Glock

MusBox

Vibf

46

Cel

Glock

MusBox

Vibf

60

Cel

Glock

MusBox

Vibf

This system contains measures 60 through 74. The Cello (Cel) part features a melodic line with many beamed sixteenth notes and rests. The Glockenspiel (Glock) part has a steady eighth-note accompaniment. The Music Box (MusBox) part plays a simple harmonic line with eighth and quarter notes. The Vibraphone (Vibf) part provides a bass line with eighth and quarter notes, including some triplets.

75

Cel

Glock

MusBox

Vibf

This system contains measures 75 through 90. The Cello (Cel) part continues its melodic line with beamed sixteenth notes. The Glockenspiel (Glock) part maintains its eighth-note accompaniment. The Music Box (MusBox) part continues its harmonic line. The Vibraphone (Vibf) part continues its bass line with eighth and quarter notes.

91

Cel

Glock

MusBox

Vibf

This system contains measures 91 through 104. The Cello (Cel) part continues its melodic line. The Glockenspiel (Glock) part continues its eighth-note accompaniment. The Music Box (MusBox) part continues its harmonic line. The Vibraphone (Vibf) part continues its bass line.

105

Cel

Glock

MusBox

Vibf

This system contains measures 105 through 118. The Cello (Cel) part continues its melodic line. The Glockenspiel (Glock) part continues its eighth-note accompaniment. The Music Box (MusBox) part continues its harmonic line. The Vibraphone (Vibf) part continues its bass line.

120

Cel

Glock

MusBox

Vibf

133

Cel

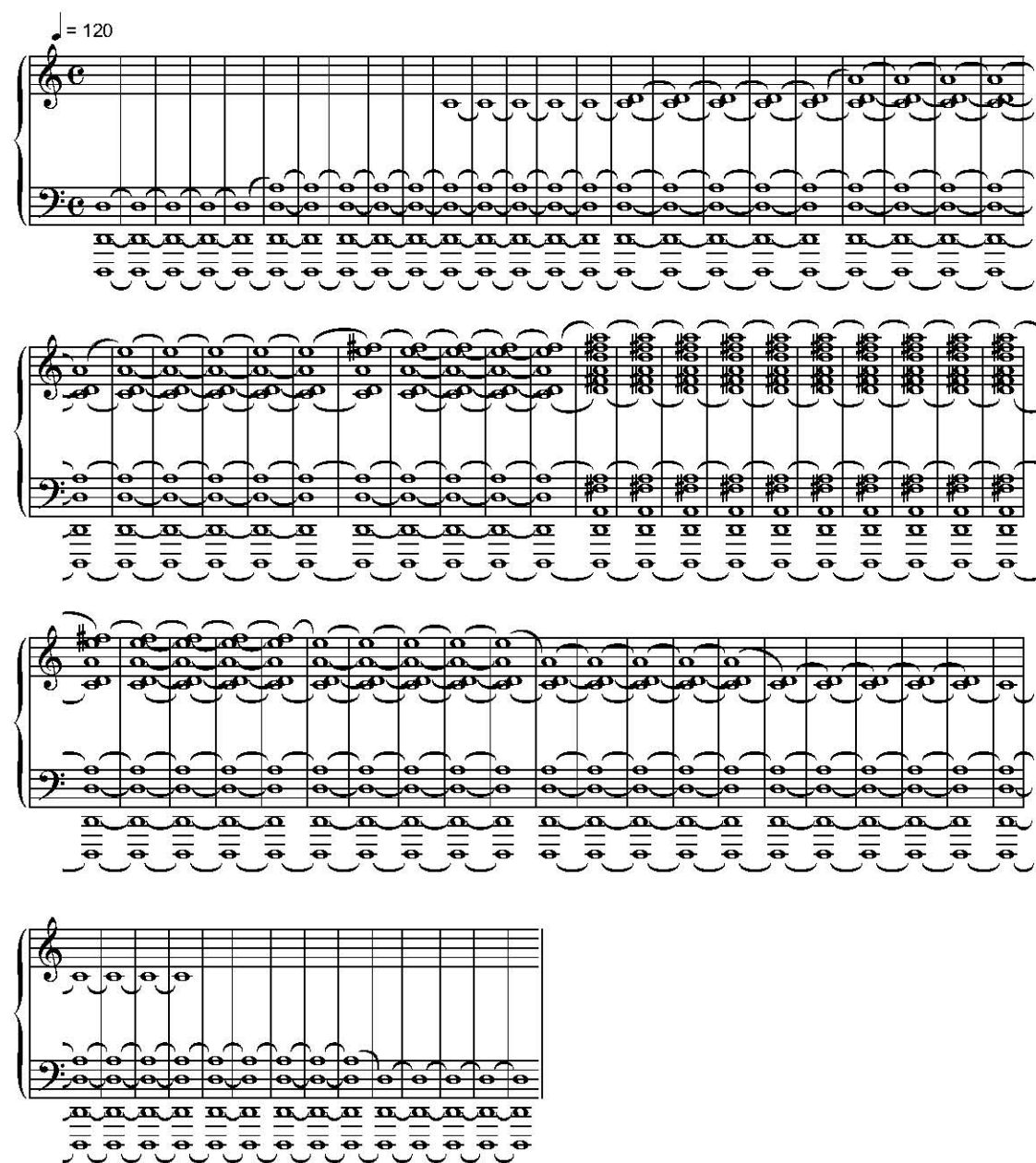
Glock

MusBox

Vibf

ORGAN CONTINUUM

$\text{♩} = 120$



The musical score is divided into four systems, each consisting of a grand staff (treble and bass clefs) and a lower staff with two rows of notes. The first system begins with a tempo marking of $\text{♩} = 120$. The notation includes various musical symbols such as notes, rests, and accidentals, indicating a complex organ piece. The second system features a key signature change to one sharp (F#) in the treble clef. The third system continues the piece with similar notation. The fourth system is shorter, ending with a final cadence. The lower staff in each system contains two rows of notes, likely representing different organ stops or a specific registration.

III

BOIL'EM CABBAGE DOWN

III. Variations On Boil 'em Cabbage Down for Chat Sonification and Piano

Allegro Vivo

This musical score is for a piece titled "III. Variations On Boil 'em Cabbage Down for Chat Sonification and Piano" in 4/4 time, marked "Allegro Vivo". The score is divided into three systems, each containing five staves. The first three staves in each system are labeled "ChatSonification1", "ChatSonification2", and "ChatSonification3" respectively. The last two staves are labeled "Piano".

System 1: ChatSonification1 begins with a *ff* dynamic. ChatSonification2 starts with a *mf* dynamic. ChatSonification3 starts with a *f* dynamic. The Piano part features a *ff* dynamic in the upper staff and a *fff* dynamic in the lower staff.

System 2: This system includes measure numbers 3, 4, and 5. It features a double bar line with repeat dots at the end of measure 4, followed by a key signature change to B-flat major in measure 5.

System 3: This system includes measure numbers 6 and 7. It continues the musical themes established in the previous systems.

ChatSonification1

ChatSonification2

ChatSonification3

Piano

ChatSonification1

ChatSonification2

ChatSonification3

Piano

ChatSonification1

ChatSonification2

ChatSonification3

Piano

ChatSonification1

ChatSonification2

ChatSonification3

Piano

ChatSonification1

ChatSonification2

ChatSonification3

Piano

ChatSonification1

ChatSonification2

ChatSonification3

Piano

ChatSonification1

ChatSonification2

ChatSonification3

Piano

24 25

The image displays a musical score for a performance of "The Sound of Silence" by the band The Beatles. The score is written for four parts: ChatSonification1, ChatSonification2, ChatSonification3, and Piano. The key signature is B-flat major (two flats), and the time signature is 4/4. The score is divided into three measures, with measure numbers 27, 28, and 29 indicated above the staves. A double bar line is present at the end of measure 29. The ChatSonification parts are written in treble clef, while the Piano part is written in bass clef. The Piano part includes a bass line and a chordal accompaniment. The ChatSonification parts feature various musical notations, including eighth notes, quarter notes, and rests, with some notes marked with a dot above them. The overall style is a clean, professional musical score.

ChatSonification1

ChatSonification2

ChatSonification3

Piano

ChatSonification1

ChatSonification2

ChatSonification3

Piano

ChatSonification1

ChatSonification2

ChatSonification3

Piano

ChatSonification1

ChatSonification2

ChatSonification3

Piano

ChatSonification1

ChatSonification2

ChatSonification3

Piano

ChatSonification1

ChatSonification2

ChatSonification3

Piano

ChatSonification1

ChatSonification2

ChatSonification3

Piano

ChatSonification1

ChatSonification2

ChatSonification3

Piano

ChatSonification1

ChatSonification2

ChatSonification3

Piano

ChatSonification1

ChatSonification2

ChatSonification3

Piano

ChatSonification1

ChatSonification2

ChatSonification3

Piano

52 53

fff *f* *fff*

ChatSonification1

ChatSonification2

ChatSonification3

Piano

54

fff

ChatSonification1

ChatSonification2

ChatSonification3

Piano

56 57

fff

15 November 2013