

Three Meditations on the Philosophy of Boethius

Performance Instructions

by

Gil Dori

A Thesis Presented in Partial Fulfillment  
of the Requirements for the Degree  
Master of Music

Approved April 2013 by the  
Graduate Supervisory Committee:

Glenn Hackbarth, Chair  
James DeMars  
Sabine Feisst

ARIZONA STATE UNIVERSITY

May 2013

## ABSTRACT

Three Meditations on the Philosophy of Boethius is a musical piece for guitar, piano interior, and computer. Each of the three movements, or meditations, reflects one level of music according to the medieval philosopher Boethius: *Musica Mundana*, *Musica Humana*, and *Musica Instrumentalis*. From spatial aspects, through the human element, to letting sound evolve freely, different movements revolve around different sounds and sound producing techniques.

TABLE OF CONTENTS

	Page
LIST OF FIGURES.....	iii
CHAPTER	
1 INTRODUCTION.....	1
2 COMPUTER.....	5
Movement I.....	5
Movement II.....	8
Movement III.....	9
3 GUITAR.....	10
Movement I.....	10
Movement II.....	11
Movement III.....	12
4 PIANO INTERIOR.....	13
Movement I.....	16
Movement II.....	16
Movement III.....	17
APPENDIX	
A MUSIC SCORE.....	18

## LIST OF FIGURES

Figure	Page
1. Time Bracket.....	2
2. Stage Setup.....	3
3. Play With Hand.....	10
4. Play With Pick.....	10
5. Piano Diagram.....	14
6. Soft Bass Drum Beater.....	14
7. Hard Rubber Beater.....	15
8. Soft Timpani Mallet.....	15
9. Play With Hand.....	15

## Introduction

In his work *De Institutione Musica* the Medieval philosopher Boethius introduced three levels of music:

- *Musica Mundana*- music of the spheres and the world,
- *Musica Humana*- music of the human body,
- *Musica Instrumentalis*- instrumental music.

This piece, for guitar, piano interior, and computer, meditates on this idea. Each of the three movements corresponds to one of these levels, and emphasizes a different aspect in the music and sounds.

Movement I is a meditation on *musica mundana*. It revolves around spatial aspects, from synthesizing frequencies of the performing space to producing sounds from different places in the instruments.

Movement II is a meditation on *musica humana*. It emphasizes the human aspect in music, such as touch, attentiveness, and virtuosity. Also, the tempo is set by the pulses of the performer's heartbeat.

Movement III is a meditation on *musica instrumentalis*. As opposed to the second movement, this movement takes away some of the performers' control over the sounds. This is done by using a variety of objects to produce sound, applying indeterminate procedures, and letting sounds evolve freely.

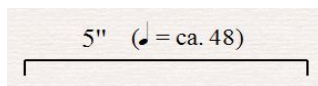
In addition, all of the movements are set in the ratios of the perfect intervals- the octave (1:2), the perfect fifth (2:3), and the perfect fourth (3:4). This occurs in the large level of the whole movement, but also in sub-divisions, and overlapping proportions of different instruments. Movement I is dominated by the 1:2 ratio, movement II is 2:3, and movement III is 3:4. These ratios are reflected in all of the timed sections in the piece.

Large numbers in the format of **minutes'** and **seconds''** indicate these timed sections, and show the general progress in time. These time frames must be followed as written.

The total duration of the piece is 20'30":

- Movement I- 10'15",
- Movement II- 5'00",
- Movement III- 5'15".

Brackets with a number of seconds, sometimes coupled with an estimated tempo, indicate duration of the event.



*Figure 1.* Time bracket.

As opposed to the main sections, these inner duration can vary from performance to performance.

For the performer's convenience, instead of a simple stopwatch an optional Max patch designed to track time for the specific part can be used.

Stage setup:

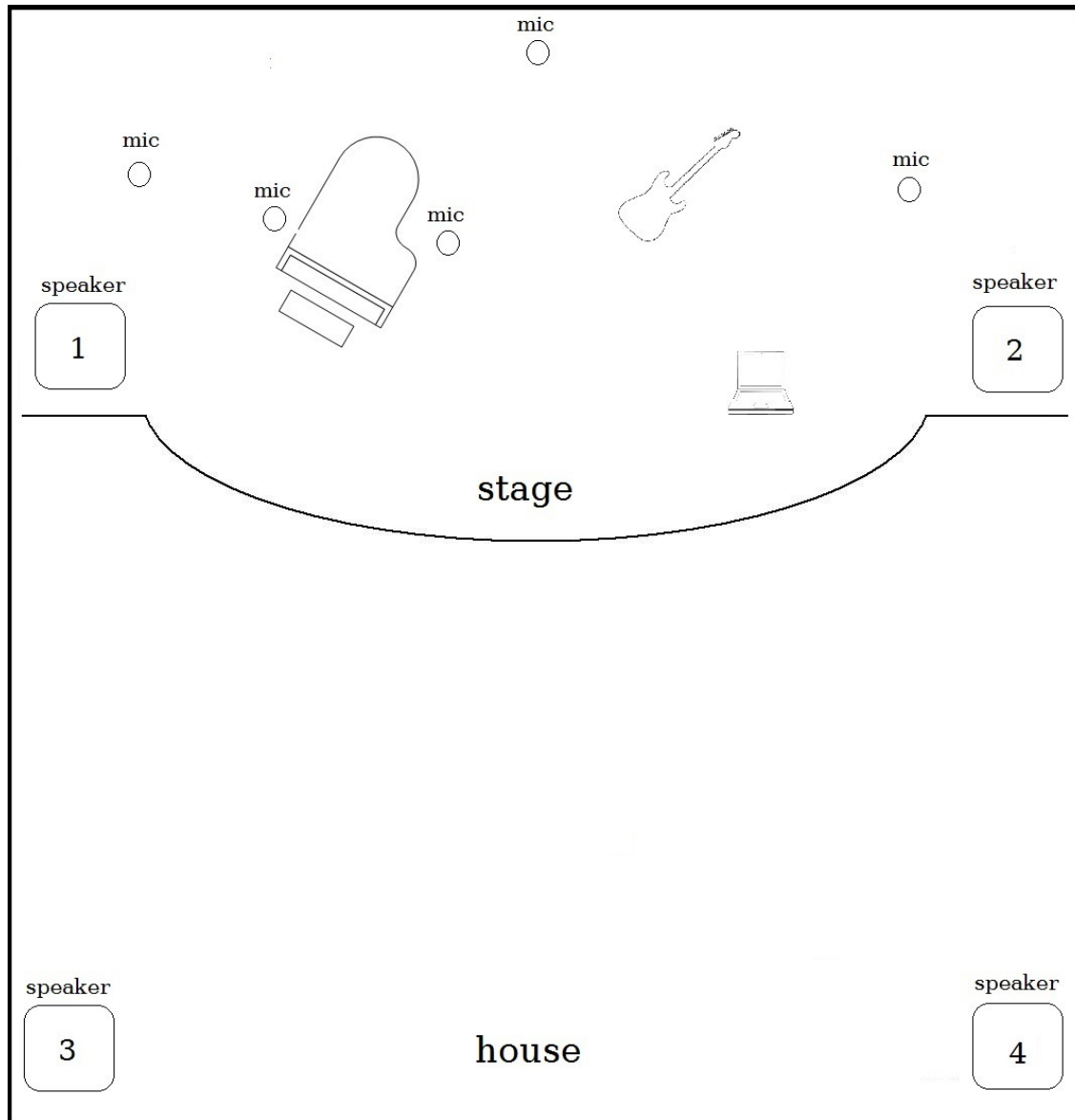


Figure 2. Stage Setup.

The piano is to be amplified with at least two microphones (represented on the diagram by those closest to the piano.) The piano microphones are connected directly to the house amplification system, and are routed to speakers 1 and 2 only. The electronic setup

should also include several other condenser microphones which are routed to the computer via an audio interface. These are represented in the diagram by the three other microphones distributed around the stage.

The overall level should be balanced equally. In other words, instrument should be heard equally when played in a similar dynamic level.

The precise position of the performers on stage is only a suggestion.



## **Computer**

The boxed instructions in the score are for the operator. However, all the procedures regarding to generating and processing audio are automated. The computer part consists of four functions:

- Producing sounds by synthesizing incoming random frequencies,
- Real-time processing of sounds coming from the guitar and piano,
- Recording sounds coming from the guitar and piano,
- Playback recorded sounds, with or without processing.

Randomization is a key element in the computer part. The computer is capable of contributing to the piece differently each time, being a main driver to the piece's indeterminacy.

## **Movement I**

In the first movement the computer has three different activities.

The first one, starting at the beginning of the piece, creates a slowly evolving texture by synthesizing incoming frequencies. This texture lasts for about six minutes, with a general dynamic shape of an arch characterized by a slow crescendo and thickening of the texture, followed by a slow decrescendo and thinning of the texture. The texture has five layers, each functioning differently with regard to the shaping of the sounds being produced, the time frame of its activity, and rate of its activity.

The incoming frequencies are frequencies that are found naturally in the space of the performance. They could be anything from air vibrations caused by an air conditioner, the rustle from the audience, static noise from the amplification, or even the sound of the moving parts of the computer itself. The purpose of this is to use sounds that are found in the space.

The second activity is to record the two other instruments, and to store this recording on the hard disk. This recording will be used in the second movement.

The third activity is to process sounds coming from the piano and the guitar in real-time. This processing involves pitch shifting and time shifting using granular synthesis.

The main synthesizer that is used to create the texture mentioned above is constructed of five different synthesizers, each corresponds to a different layer of the texture.

**Synthesizer 1** is the fundamental drone. It operates from 0'00" to 6'08", and it is shaped to crescendo very slowly from 0'00" to 4'00". Then, from 4'09" it begins to decrescendo, until it reaches a complete silence at 6'08". The sounds it makes will start like a murmur, but will get more complex and interesting very slowly, as the activity gets more complex and more elements are added to the drone.

**Synthesizer 2** begins at 0'41". It adds a rhythmic element to the texture, by shaping the sounds to pulse with a fast attack and an immediate decay. It also doubles the incoming frequencies, which makes them an octave higher, and adds harmonics- one a little less than an octave above, and one a little more than an octave above the doubled frequency.

It is also designed to send the pulsing sounds randomly in the stereo field, but only to speakers 1 and 2. The rate of the pulses is random as well. However, the time between attacks will decrease gradually, and the volume will increase. In other words, attacks will get louder and faster until the texture reaches its peak at 4'06". From there it will progress back in the opposite direction, until it comes to a final stop at 6'00". Using a frequency modulator (FM), it creates synthesized bell sounds, which vibrates slightly as it decays. The index and ratio of the FM will be randomly selected out of pre-determined values.

**Synthesizer 3** begins at 1'22" and corresponds to synthesizer 1, as a drone with a dynamic shape of an arch, but with a difference of the complexity in the synthesis. Synthesizer 3 starts with a square wave, which is richer in harmonic content, and involves tripling the incoming frequencies, which makes them an octave and fifth higher. It also involves frequency modulator. The index and the ratio of the FM increase as the dynamic level climbs. At 4'06" the decrescendo begins, but these values stay the same throughout the course of the decrescendo. It stops completely at 6'08". Since synthesizer 3 operates in a different time span than synthesizer 1, its overall progress of crescendo to decrescendo is faster. Throughout this time, the sound coming out of synthesizer 3 pans around the stereo field (speakers 1 and 2 only), from the leftmost position, then slowly to the rightmost, and back.

**Synthesizer 4** plays from 2'03" to 6'03". It has the reverse envelope of synthesizer 2. The volume, the FM values, and the placing in the stereo field are completely random, with two exceptions. The first is that the range of FM values will be confined in order to maintain the bell-like sounds (but not pre-determined as in synthesizer 2.)

The second is that until 4'57" panning is limited to speakers 1 and 2. Only from that point sounds are sent to all four speakers. Synthesizer 4 is five and a third times the incoming frequency, making it sound two octaves and a fourth above.

**Synthesizer 5** starts at 4'06". Its progression is more complex, and lasts until 6'08".

It takes the incoming frequencies to a sawtooth wave shaped in a way that follows the inverted contour of the guitar part in this particular section. It revolves around the stereo field, beginning with speaker 4, and slowly move to 3, then 2, to finish with 1.

At **6'09"** the operator begins to record sounds coming from the other instruments, using the recording module in the patch. These recorded sounds will be used in the third movement.

At **7'31"** the operator begins the real-time sound processing. This involves granular pitch shifting and time shifting modules. Both of them operate randomly, so audio is processed in way that could make the sounds either very short or very long, transposed higher or lower. The outcome could sound either relatively natural and close to the incoming audio, or far from it and very artificial, with a metallic timbre to it.

The audio is send randomly to different speakers at random dynamic levels.

## **Movement II**

Since the second movement emphasizes the human element in music, the only function of the computer here is to record audio coming from the piano and the guitar and store it for its use in movement III.

### **Movement III**

This movement starts with recording the guitar. Immediately after 45 seconds of recording, the recorded sound will be played back with granular processing of pitch and time.

At **2'27"** the operator plays the audio files that were recorded in movements I and II, by a playback module that selects random excerpts of 10-60 seconds. Audio is sent randomly to different speakers, but no other manipulation is applied.

The dynamic contour for this section is shaped in the same manner as the beginning, with an arch of a slow crescendo (2'27" to 4'03") and a decrescendo (4'03" to 5'15").

When the fade out begins at 4'03", the randomization of stereo is stopped. The fade out begins with audio being sent to speaker 4. Then, similarly to movement I, it moves to speaker 3, then 2, to finish with 1 as the pieces comes to an end.

## Guitar

The guitar part calls for a volume pedal, an e-bow, a slider, and a pick.

The e-bow and the slider are to be used only in movement III

Generally, sound should be clean. However, adding a light reverb and/or overdrive is optional, depending on the performing space and its acoustics.

Verbal instruction and additional information marked with an asterisk will indicate how to play certain sections or segments.

Other instructions:

Play with hand



*Figure 3.* Play with Hand

Play with a pick



*Figure 4.* Play with pick.

### Movement I

**4'06"** Right hand glissando (RH gliss.): Hold down the indicated note with the left hand regularly. Then, with the fingernails of the right hand scrape the string slowly from that point to the bridge.

**4'57"** Pinch: Hold down the indicated note with the left hand regularly. Then, using p and I, pinch the string 12 frets higher from that point, producing a rather hollow sound.

## **Movement II**

In Movement II the tempo is set by the heartbeat of the performer who plays the piano, One pulse equals one quarter note. Unlike the other movements, there are no indications for durations. Instead, the performer should play the movement ad. lib. with regard to the general time marks.

The performer may or may not improvise during the movement. If the performer decides to improvise, the improvisation is to be based on the boxed material,

Generally, the progress in this movement is linear. However the performer is free to go back to previous boxed material and to improvise in a way that combines material from different parts of the movement.

**0'48"** Improvise in a way that follows the piano as closely as possible. The sounds are limited to:

- Pluck muted strings,
- Pluck behind the nut,
- Scrape strings lengthwise with fingernails,
- Pinch string 12 frets higher than where the left hand fingers the note,
- Tambora.

### **Movement III**

In this movement sounds are produced by using an e-bow, a slider, and a pick. Use e-bow only in fundamental mode. Do not use it in harmonic mode.

**0'45"** Tambora with slider: hold the slider in your right hand. Then, drum it lightly in a fast tambora motion. Explore the whole range of the guitar by moving your right hand back and forth from the bridge to the nut.



## Piano Interior

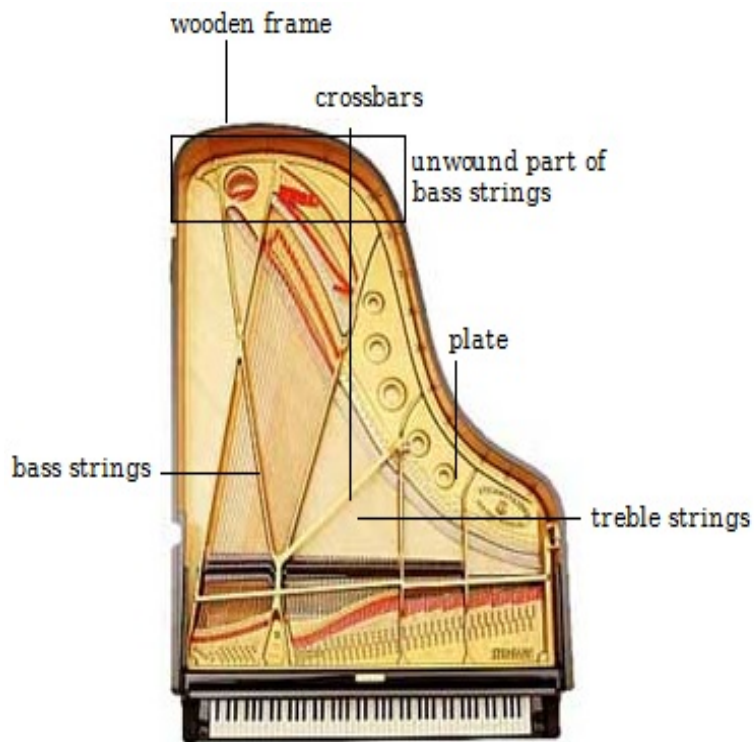
The top staff represents the strings. Pitches are indefinite. The bottom part, under the middle line, represents the wound bass strings. The lowest line is the bottom of the register. The top part, above the middle line, represents the treble strings. The highest line is the top of the register.

The bottom staff represents percussive sounds played on different spots of the piano.

Respectively to the lines of the staff:

_____	Wooden frame
_____	Cross bars
_____	Plate
_____	Pedals (as a percussive element, as oppose the regular pedal marks)

All the top three can be played anywhere (in regard to the specific sound), to the convenience of the performer. Their location can be seen in the piano diagram below:



*Figure 5. Piano Diagram.*

The required beaters are:

Soft bass drum beater



*Figure 6. Soft Bass Drum Beater.*

Hard rubber beater



*Figure 7.* Hard Rubber Beater.

Soft timpani mallet



*Figure 8.* Soft Timpani Mallet.

Play with hands, additional verbal instruction will indicate which part of the hand.



*Figure 9.* Play With Hand.

Verbal instruction and additional information marked with an asterisk will indicate how to play certain sections or segments.

## **Movement I**

**3'28"** 'Pedal snap' means to create a percussive 'snap' sound by holding down the pedal, then quickly removing the foot.

At **4'14"** the performer is asked to create a haunting sound by dragging a hard rubber beat on the strings in a circular motion.

At **5'23"** the performer is asked to improvise on given rhythmic figures, playing on the unwound part of the base strings (see figure 5.) This gives a high muted pizzicato sound. According to the sounds in the texture that the computer produces at this point, the performer can choose whether to improvise in a way that contrasts the texture or compliments its rhythmic elements.

## **Movement II**

In Movement II the heartbeat of the performer will set the tempo. One pulse equals one quartet note. Unlike the other movements, there are no indications for durations. Instead, play the movement *ad. lib.* with regard to the general time marks.

The performer may or may not improvise during the movement. If the performer decides to improvise, the improvisation should be based on the boxed material.

Generally, the progress in this movement is linear. However the performer is free to go back to previous boxed material and to improvise in a way that combines material from different parts of the movement.

### **Movement III**

**2'15"** Improvise in a way that follows the guitar as closely as possible. The sounds are limited to:

- Pluck strings with guitar pick,
- Scrape string lengthwise with guitar pick,
- Drag a hard rubber beat on the strings in a circular motion,
- Tremolo with hard rubber beater.

**3'27"** Glissando with a glass bottle/drinking glass: Here the performer is instructed to slide a cylindrical glass object on the strings. Pressing the object firmly to the strings is recommended to prevent buzzing. Pluck the strings, then slide the object.

At **4'15"** the performer is instructed to roll the glass cylindrical object freely on the strings, as well as to bounce a tennis ball (or similar spherical object) freely on the strings. It could be in any area of the piano, and the purpose is to produce random, uncontrollable sounds.

**Gil Dori**

**Three Meditations on the Philosophy of Boethius**

**for computer, piano interior, and guitar**

# Three Meditations on the Philosophy of Boethius

## I *Musica Mundana*

Gil Dori

0'00"

0'41"

Computer

*begin synthesizers sequence*

*Synth 1 starts*

*Synth 2 starts*

1'22"

Comp.

*Synth 3 starts*

1'22"

Pno. P.

8-10"

*mp*

L.V.

8-10"

*f*

*p*

8-10"

*mp*

*mf*

*p*

8-10"

L.V.

2'03"

Comp.

*Synth 4 starts*

2'03"

Pno. P.

8-10"

*ppp*

*pp*

8-10"

*ppp*

*pp*

*p*

*pp*

8-10"

*ppp*

*pp*

*sempre* 





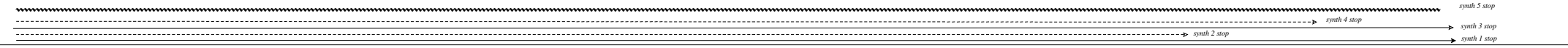
5'23"

6'00"

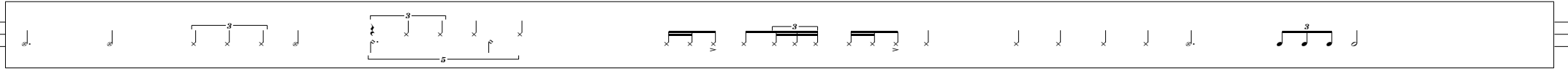
6'03"

6'08"

Comp.



Pluck the unwound part of the strings at the edge of the piano.  
 Improvise in a way that corresponds to sounds produced by laptop-  
 either following its rhythmic activity or contrasting the general texture.  
 Use these rhythmic patterns, tempo ad. lib.



E. Gtr.

5'28"

RH gliss.

*p*

*mp*

*f*

6'09"

Comp.

begin recording  
 buffer 1  
 buffer size= 621"; recording duration= 121"

6'09"

scrape strings lengthwise with fingernail  
 15" (♩ = ca. 60)  
*mf*

*p*

scrape

pluck

*p*

scrape

*mp*

6'09"

behind the nut

15" (♩ = ca. 60)

*p*

RH gliss.

*mf*

*p*

Pno. S.

sempre Ped.

6'40" (♩ = ca. 90)

Pno. S.

6'40"

E. Gtr.

Comp.

7'30" stop recording  
buffer 1  
121" of recorded material  
out of a total size of 621"

7'10" (♩ = ca. 48)

Pno. S.

Pno. P.

7'10" (♩ = ca. 40) 7'30"

E. Gtr.

7'31" begin real-time processing  
pitch shift + time shift what piano plays  
sends to different speakers randomly

Comp.

7'31" (♩ = ca. 84) 8'10"

Pno. P.

8'11"

Comp.

*pitch shift + time shift what guitar plays sends to different speakers randomly*



8'11"

*tamb.: trem. w/ i and a 10-12"*

E. Gtr.

10" (♩ = ca. 100)

behind the nut

as loudly as possible

RH gliss.

8-10" *tamb.: trem. w/ i and a*

*f* *ff* *mf* *mp* *ff*

8'53"

Comp.

*stop all sounds*

*pluck*

8'53"

Pno. S.

(♩ = ca. 80)

*pp* *ppp*

*sempre* *♩*

LV

8'53"

*pinch\**

E. Gtr.

(♩ = ca. 80)

*mp*

9'23"

*With hard rubber beater, drag around stings in a circular glissandi*

*Keep dynamic level at* **ppp-p**

*sempre* *♩*

10'15"

9'23"

E. Gtr.

5" *tamb.: trem. w/ i and a*

*pp* *mp* *p* *pp*

10'15"

**II**  
*Musica Humana*

0'00''

5'00''

Computer

*continue recording  
buffer 1*

recording continues from the point the buffer (1'21''); buffer size= 6'21''; recording duration= 5'00''; record until buffer is full

buffer is full;  
recording stops

## II Musica Humana

0'00"

♩ = the rate of your heartbeat

play the given material *ad lib.* until 4'00"

You may or may not add improvisation. Base improvisation on the boxed material.

Piano Strings

*mp*

*fingertips*

*p*

Piano Percussion

*knuckles*

*p*

\* if necessary play more quarter notes until you feel comfortable with the beat

Pno. S.

*mf*

*p*

Pno. P.

*mf*

*release slowly*

Pno. S.

*mf*

*p*

*mf*

*fingertips*

*pluck*

*fingertips*

Pno. S. *f* *pluck* *palm* *mp* *fingertips* *p* *mf* *f*

Pno. P. *palm* *fingertips*

Pno. S. *knuckles* *pp* *mp* *p* *pluck*

Pno. P. *knuckles* *ppp* *pp* *release slowly*

**4'00''**

**A Tempo**  
 play the given material ad lib. until 5'00''  
 You may or may not add improvisation. Base improvisation on the boxed material.

Pno. S. *fingertips* *mp* *mf*

**5'00''**

## II *Musica Humana*

Tempo is set by piano

0'48''

*Imitate piano as closely as possible.*

Sounds are restricted to:  
 - Pluck muted strings  
 - Pluck behind the nut  
 - Scrape strings lengthwise with fingernails  
 - Pinch string 12 frets higher than where LH finger is  
 - Tambora

end improv.

Electric Guitar



improvise until 1'52''



1'52''

*play the given material ad lib. until 4'00''*

*You may or may not add improvisation. Base improvisation on the boxed material.*

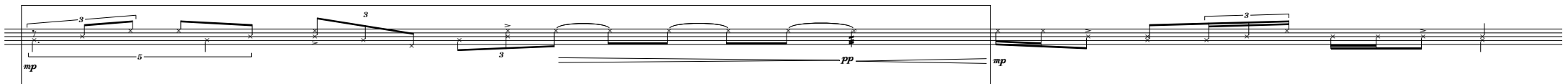
*mute strings by placing LH gently over neck pickup area*

E. Gtr.



\* if necessary play more quarter notes until you feel comfortable with the beat

E. Gtr.



E. Gtr.



E. Gtr. *ham.*

5 4 6

2 6 5

E. Gtr.

2 3 4 5 6

6 5

E. Gtr. *ord.*

7 7 7 7 3

*p*

E. Gtr.

*mf* 9 5 3 5 *p* *pp* 9 5

4'00''



### III Musica Instrumentalis

**0'00''** **0'44''**

Computer  
 begin recording  
 buffer 2  
 buffer size= 0'44"; recording duration= 0'44; record until buffer is full  
 buffer is full; recording stops

Electric Guitar  
 e-bow  
 10-12"  
 10-12"  
 10-12"  
 slowly  
 LV  
 f  
 slowly  
 mp  
 slowly  
 LV  
 ff

**0'45''**

Comp.  
 playback buffer 2  
 adds random time shift-pitch shift  
 sends audio to different speakers randomly

E. Gtr.  
 10"  
 8"  
 5"  
 behind the nut  
 tambora with slider\*  
 5"  
 behind the nut  
 8"  
 tambora: drum with i and m  
 LH slider  
 8"  
 quickly  
 10"  
 tamb. sim.  
 10"  
 v  
 ff  
 slowly

\*with the slider in your RH, go up and down the instrument drumming the strings lightly in a fast tambora motion

Comp.  
 (wavy line)

E. Gtr.  
 RH e-bow  
 LH slider  
 p  
 8"  
 6"  
 5"  
 2-4"  
 tap string with slider  
 5"  
 pp  
 mp  
 p  
 6"  
 4"

Comp. 2'15" 2'27"

stop playback buffer 2 begin playback buffer 1

*crs; sends audio to different speakers randomly*

Pno. 2'15"

Imitate guitar as closely as possible; gradually divert to improvisation based on the sound you hear.

Creat sounds using the following:

- Pluck strings with a guitar pick
- Scrape strings lengthwise with a guitar pick
- With hard rubber beater, drag around in circular glissandi
- Tremolo with hard rubber beater

*improvise until 3'27"*

E. Gtr. 2'15"

*tamb. w/ slider*  
8"

behind the nut 8" (♩ = ca. 75)

*RH e-bow*  
*LH slider*

2-4" 2" 6-8"

*tap string with slider*

*ppp* *mp* *p* *f* *mp* *ff*

Comp. end improv.

*(improvise)*

E. Gtr. 3'26"

behind the nut 15" (♩ = ca. 48)

*tamb. w/ slider*  
15-20"

*pp* *mp* *p* *pp* *slowly*

4'03"

Comp.

*begins fade out;  
sends audio to speaker 4 and slowly move to 1 as the piece ends*

3'27"

*gliss. with a glass bottle/drinking glass\**

48"

Pno.

The piano part consists of a single melodic line on a grand staff. It features four glissandi (slanted lines) and four accents (^). The first glissando is marked with '6' and 'LV'. The second glissando is marked with 'LV'. The third glissando is marked with 'LV'. The fourth glissando is marked with '6' and 'LV'. There are also four accents placed above the notes. The piece ends with a double bar line and a treble clef.

*sempre*

\*pluck the strings, then slide glass bottle/drinking glass; press the object firmly to the strings to prevent buzzing

Comp.

4'15"

8"

16"

4'39"

*Roll glass bottle/drinking glass freely over the string*

*Continue rolling action,  
add bouncing a tennis ball (or similar) on the strings.  
Catch and release ball quickly*

Comp.

5'15"