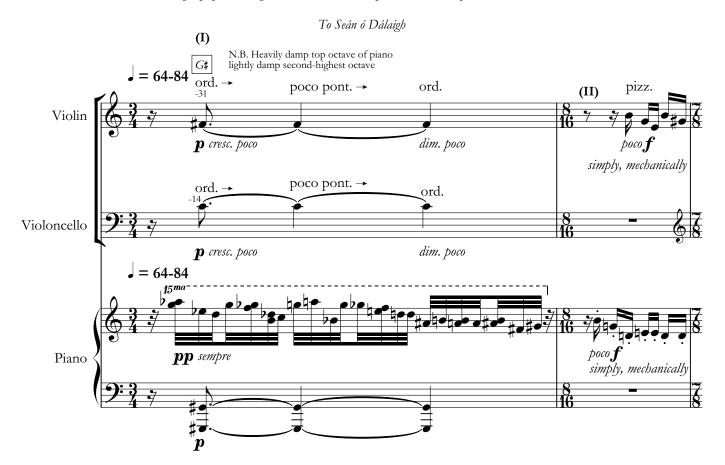
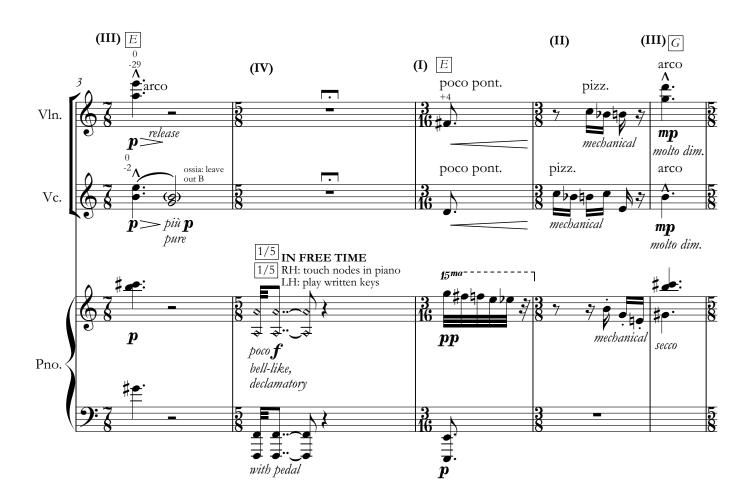
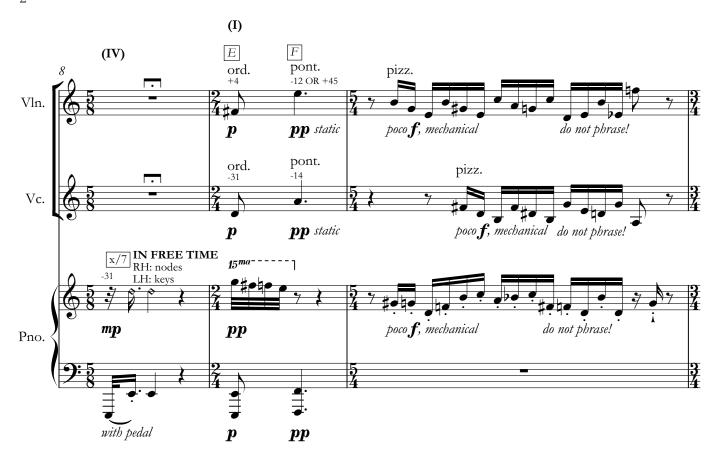
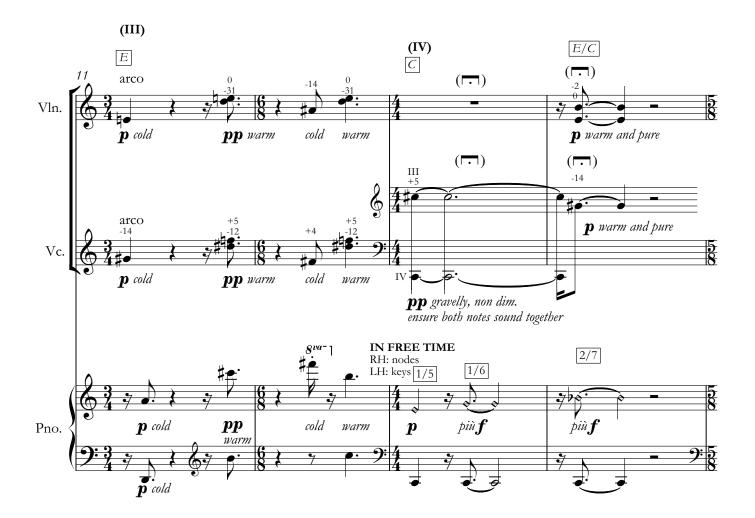
$\underset{v:\ 12/08/2018}{\text{S. Adams}}$ 

Commissioned by the Beckett Chamber Music Series, for performance by Sarah Sew, Yseult Cooper Stockdale and Jonathan Morris

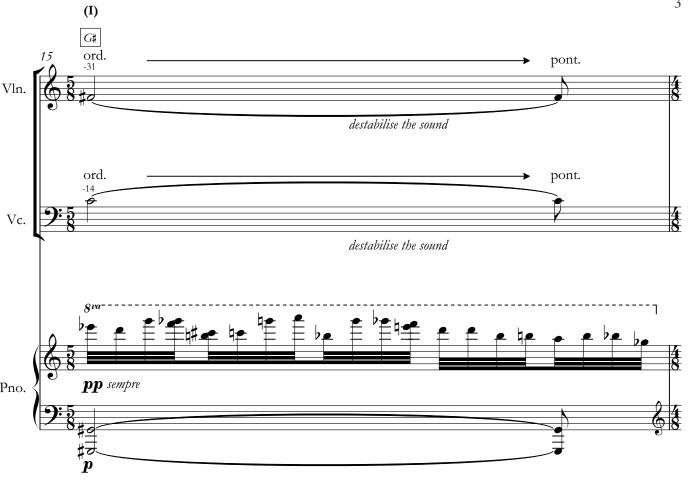


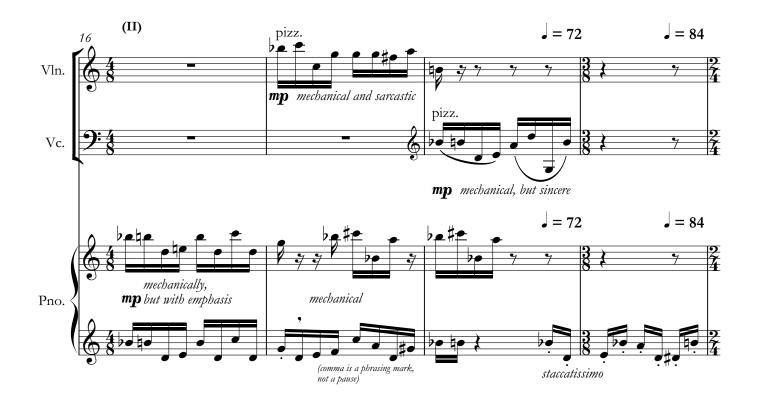


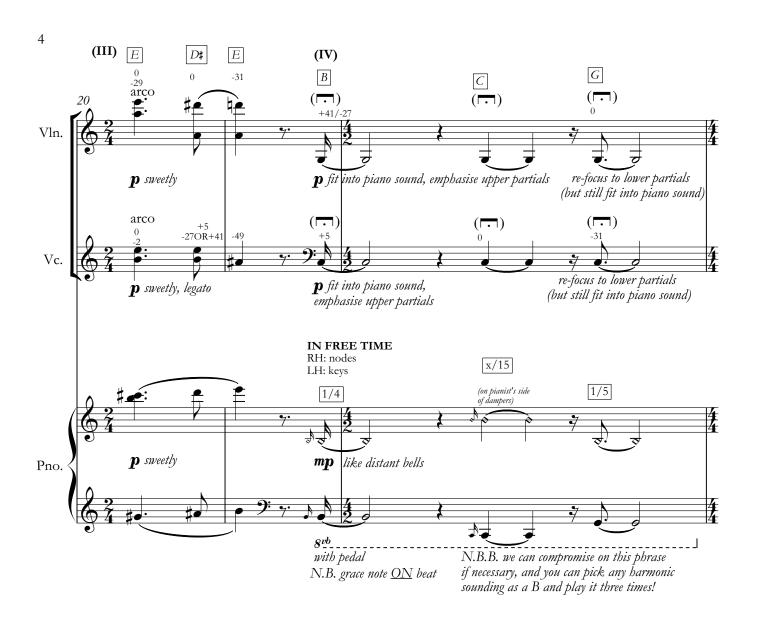


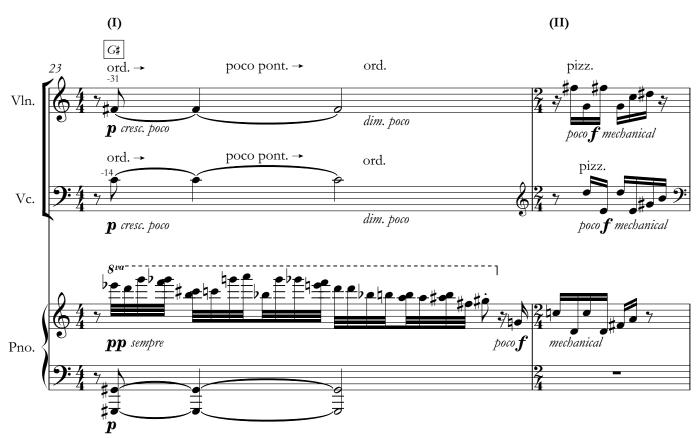




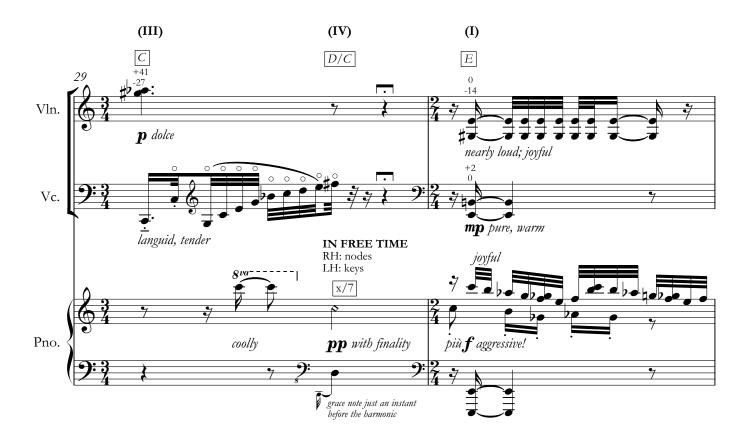








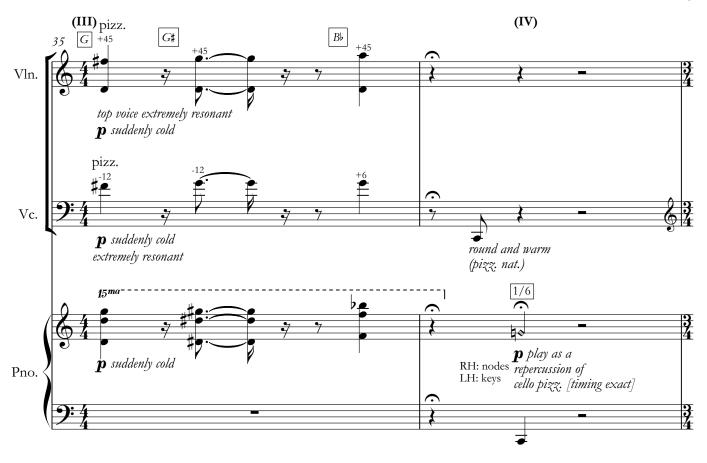


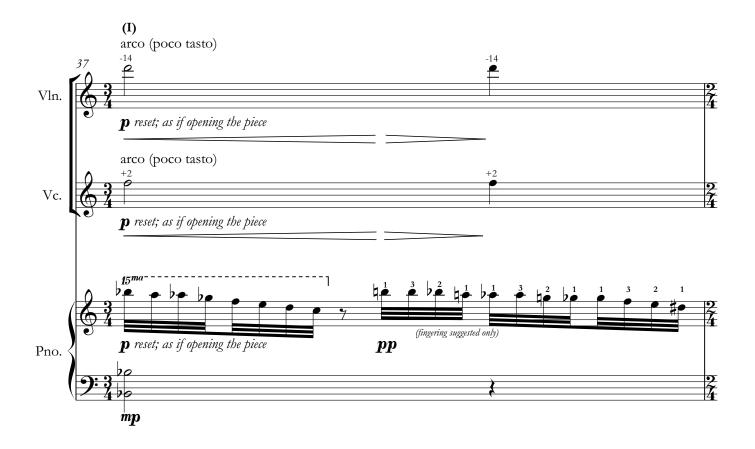


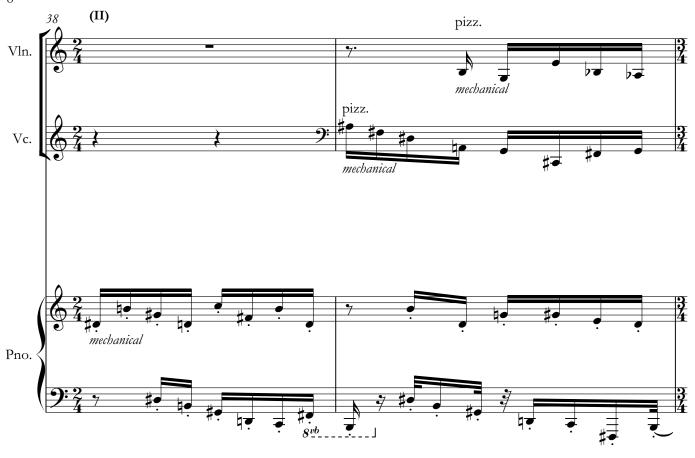
each step.

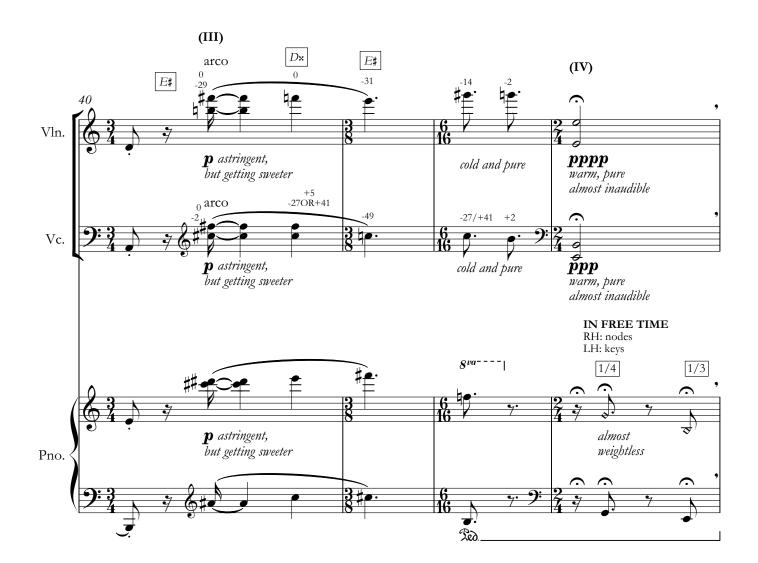


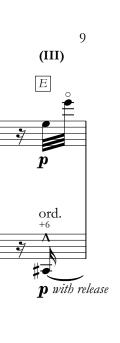


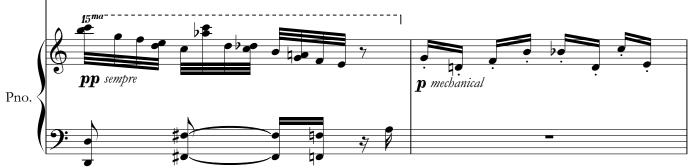












(II)

 $\boldsymbol{p}$ 

sul pont.

poco cresc.

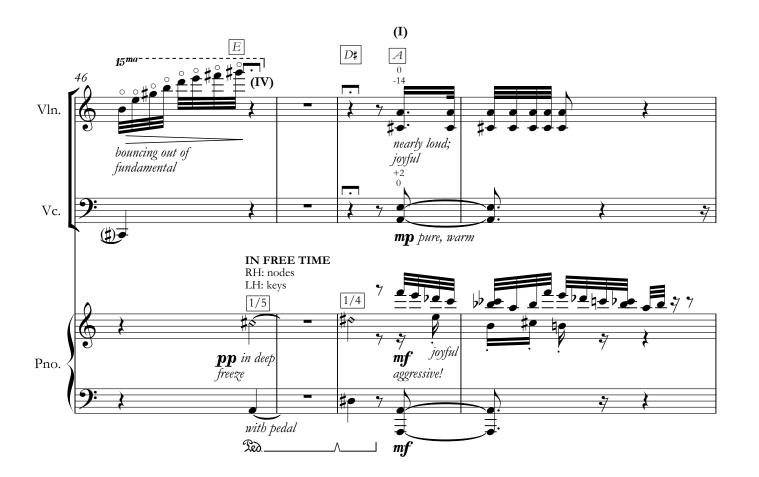
mechanical

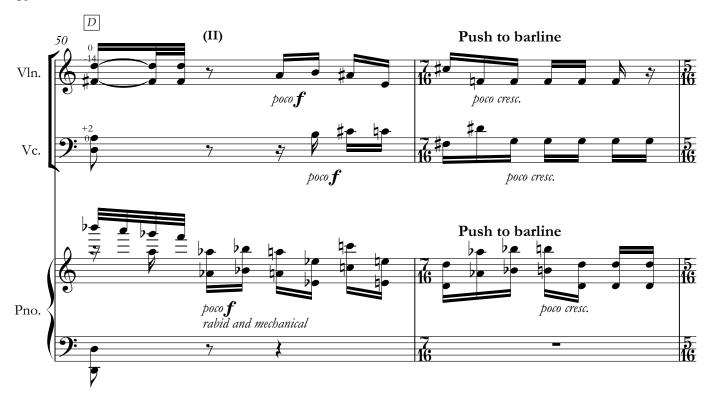
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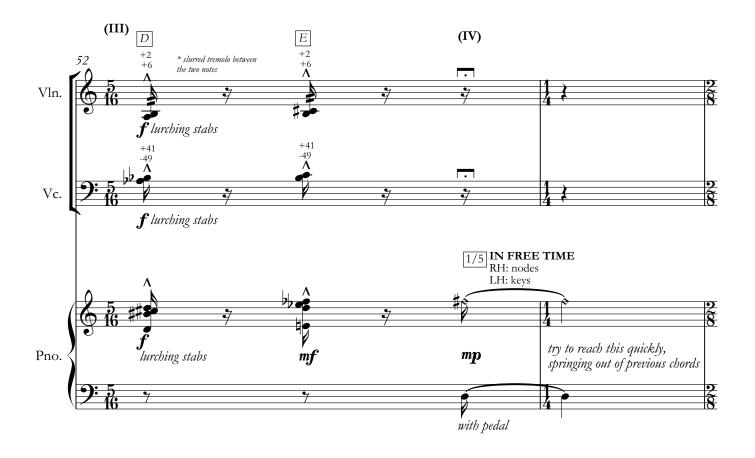
(I) D

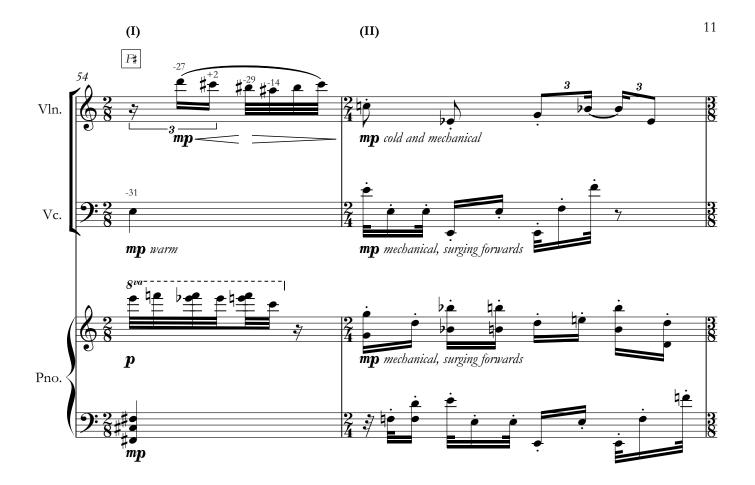
F#

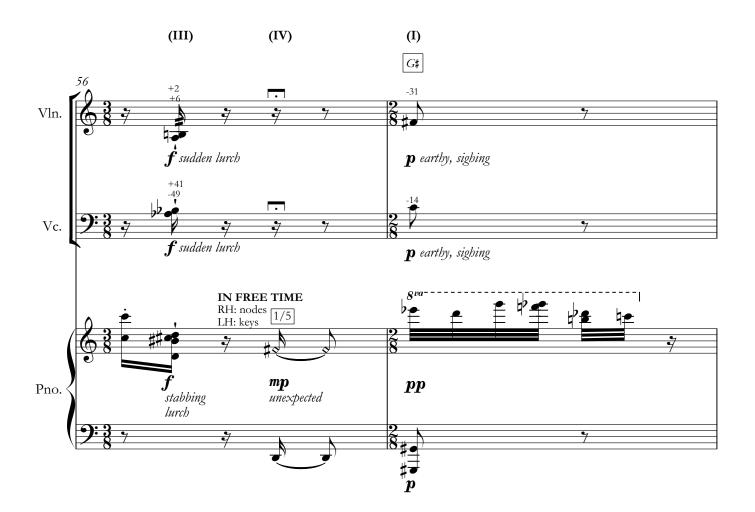
p thrown away, fleetingly

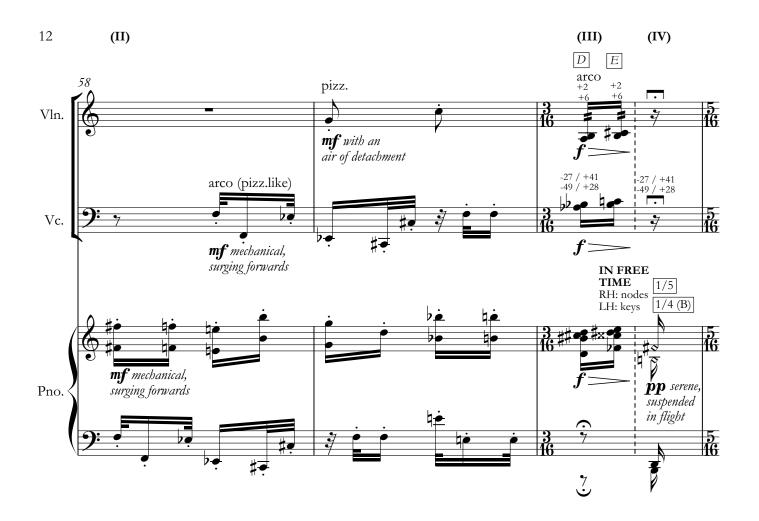




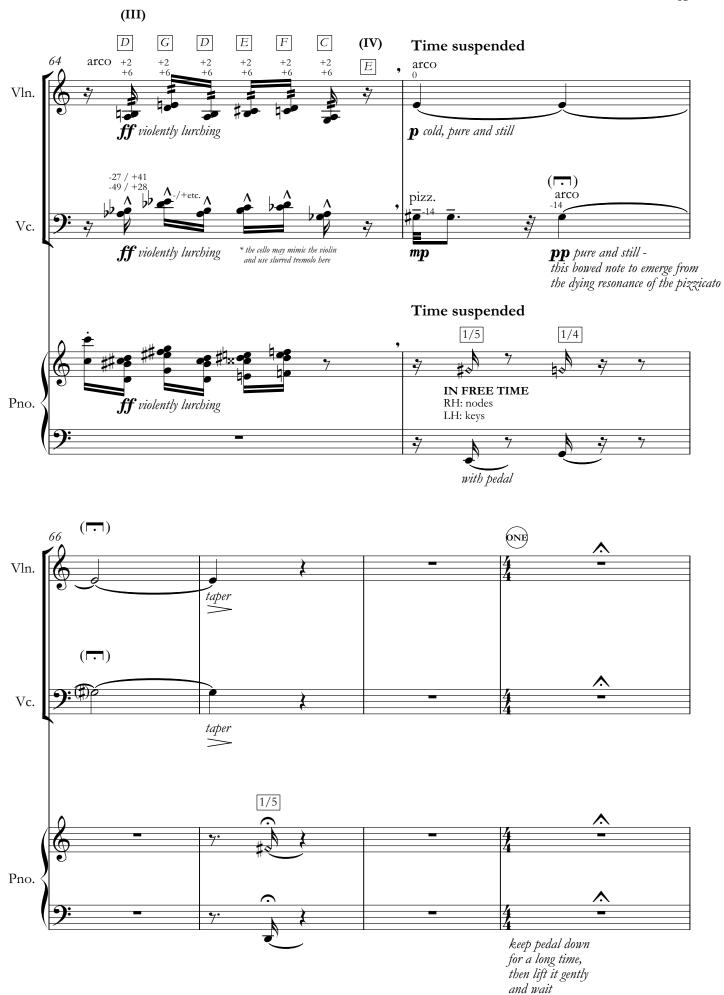




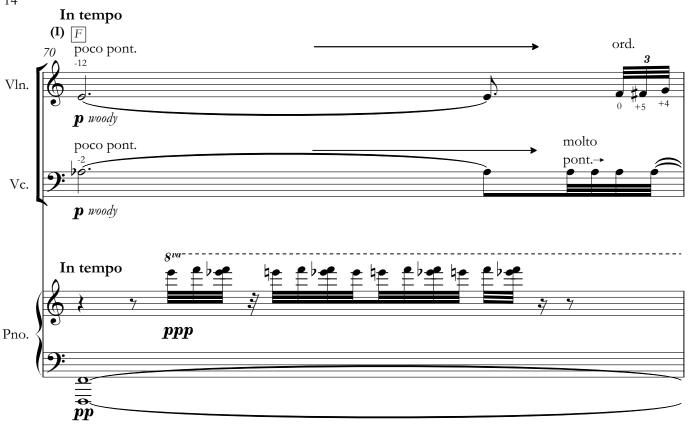


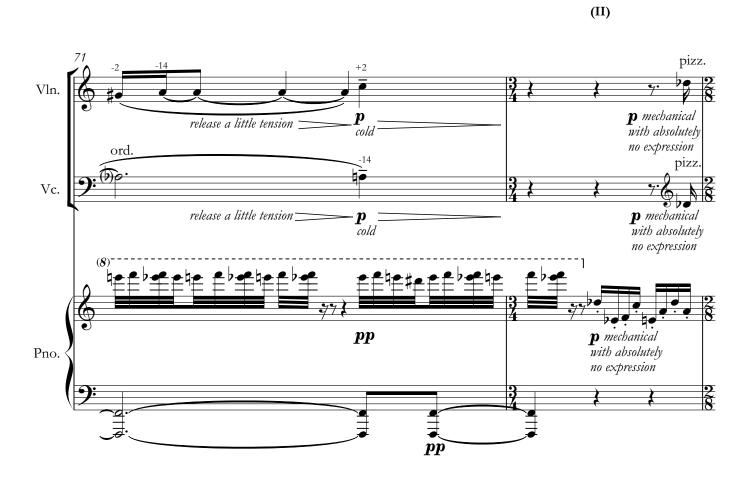




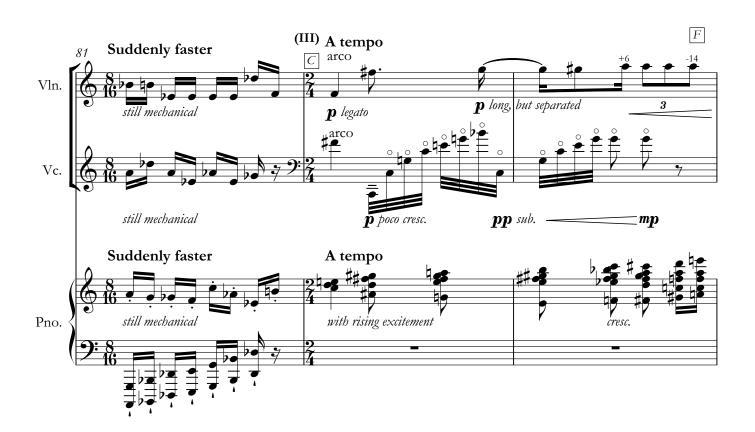


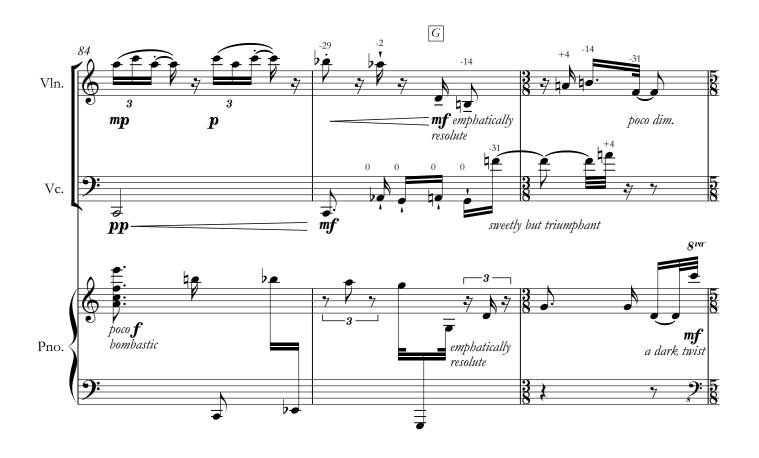


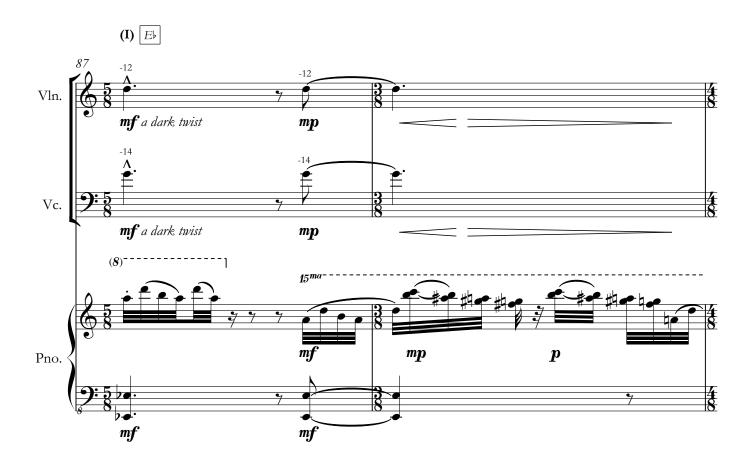






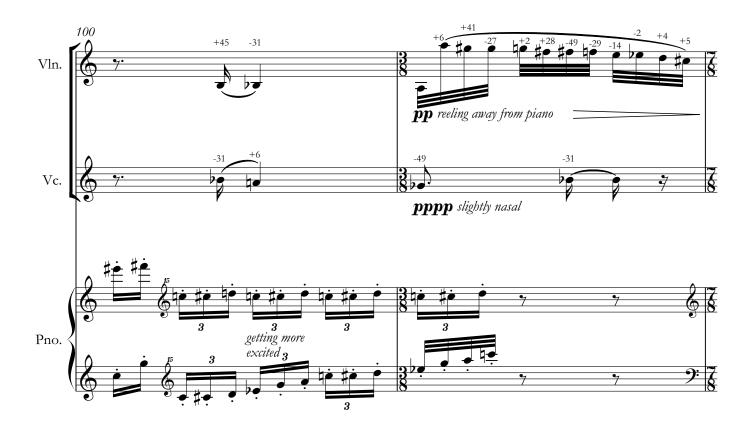




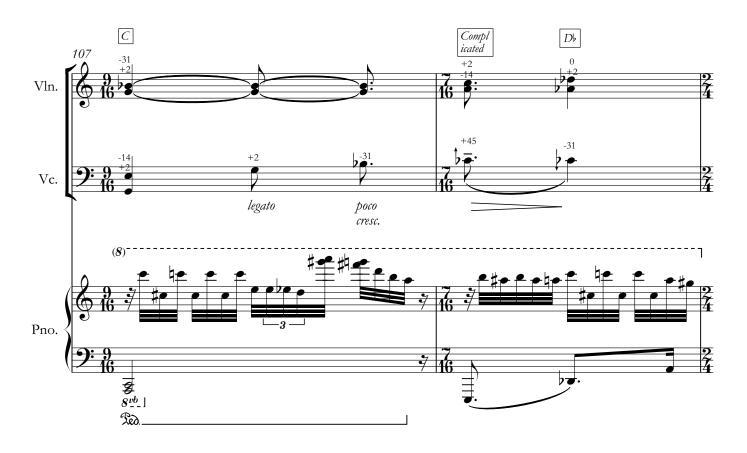






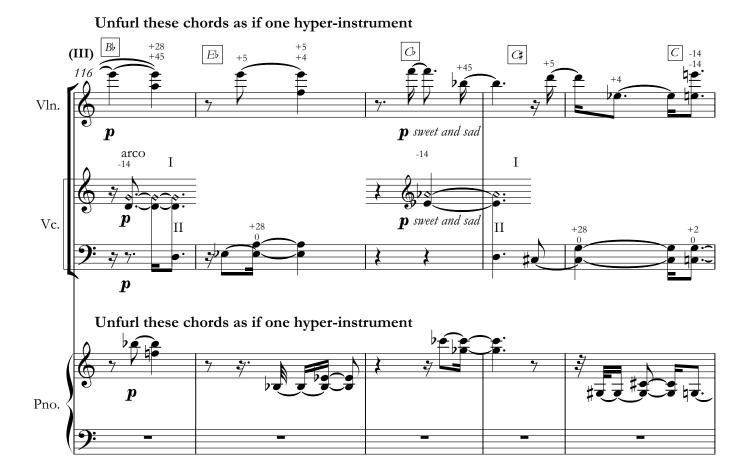


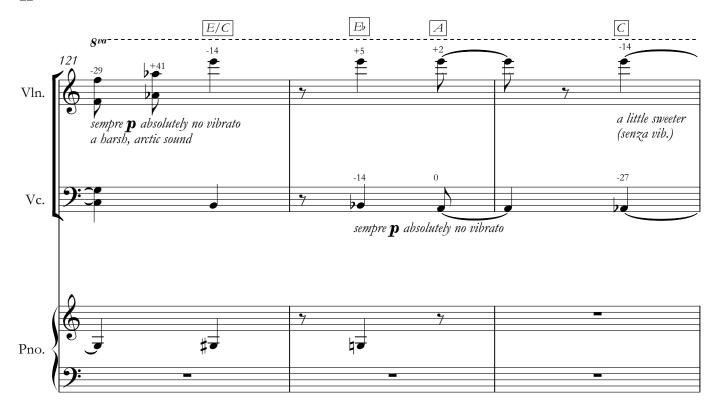


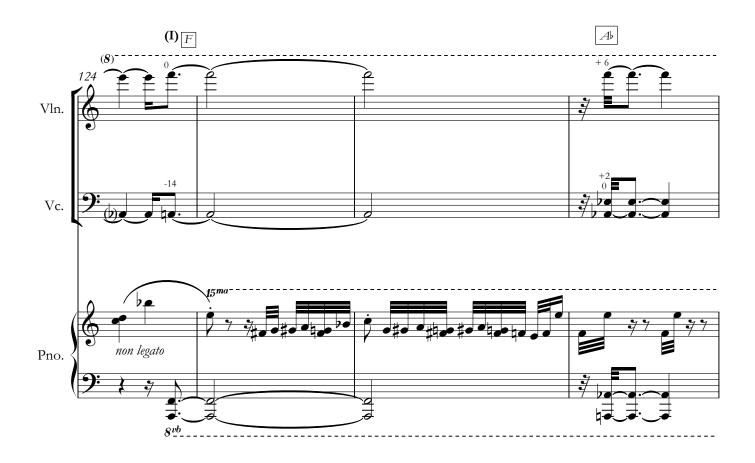


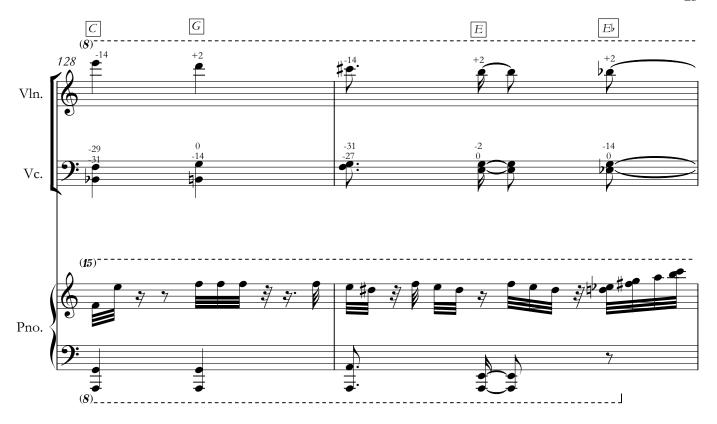


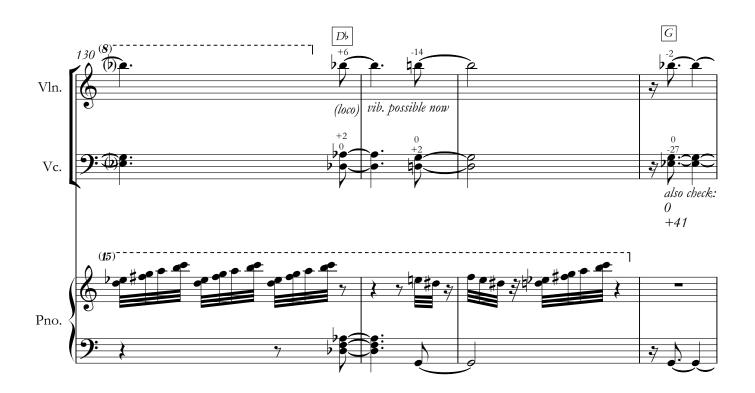


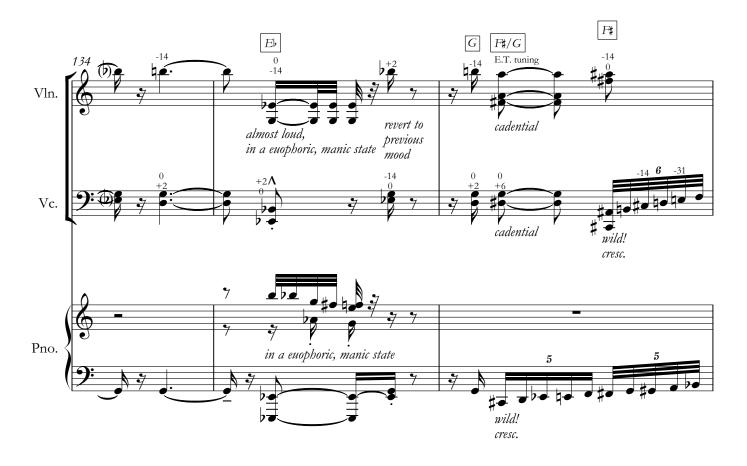












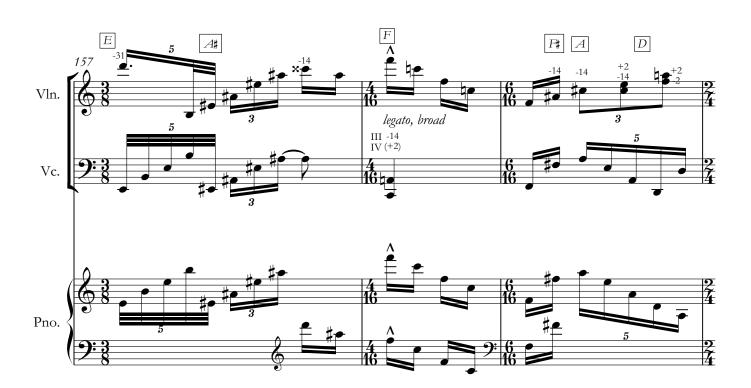


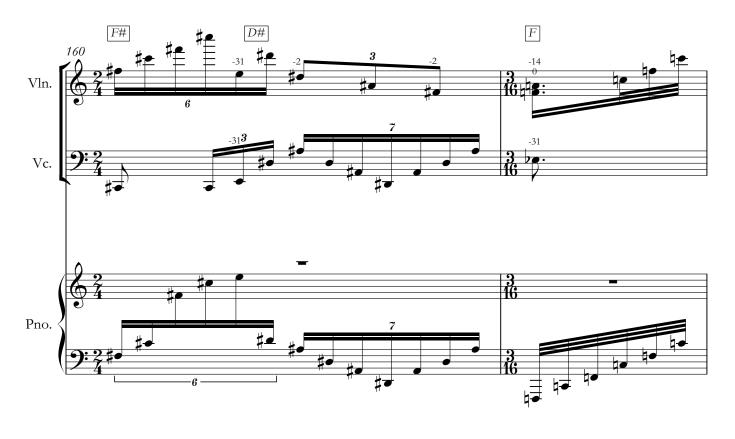


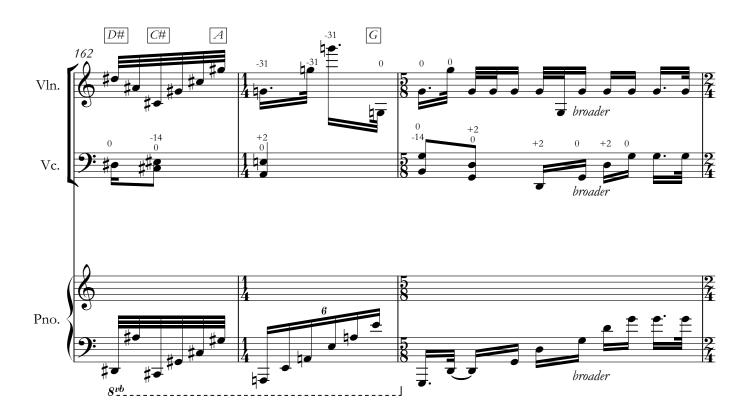


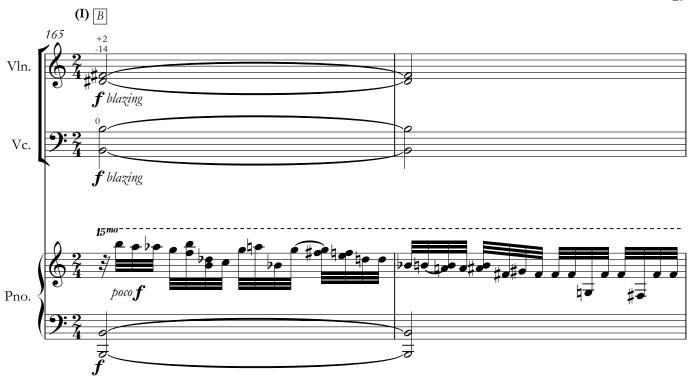




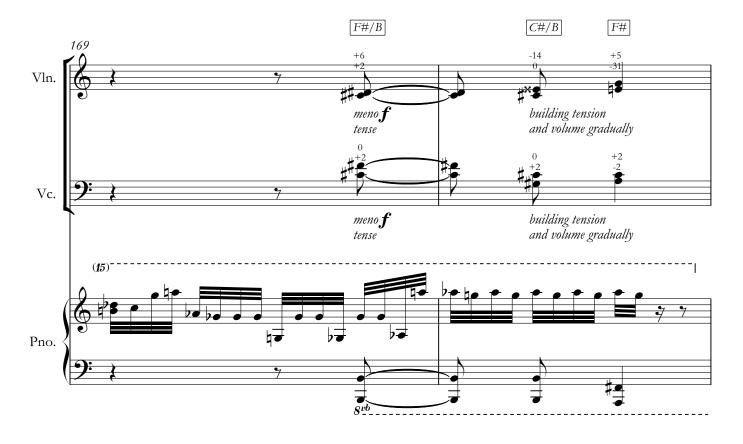


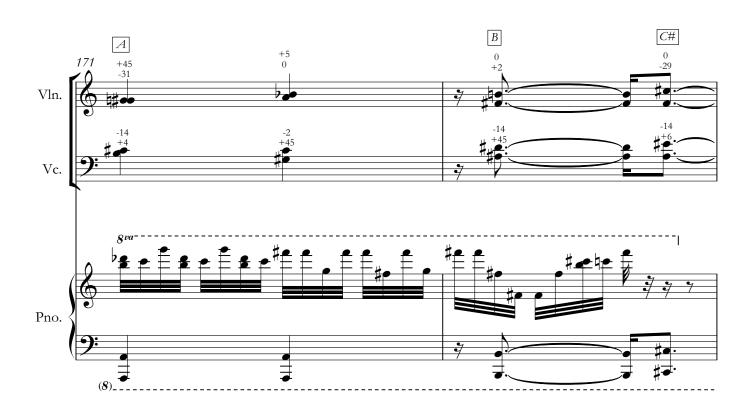




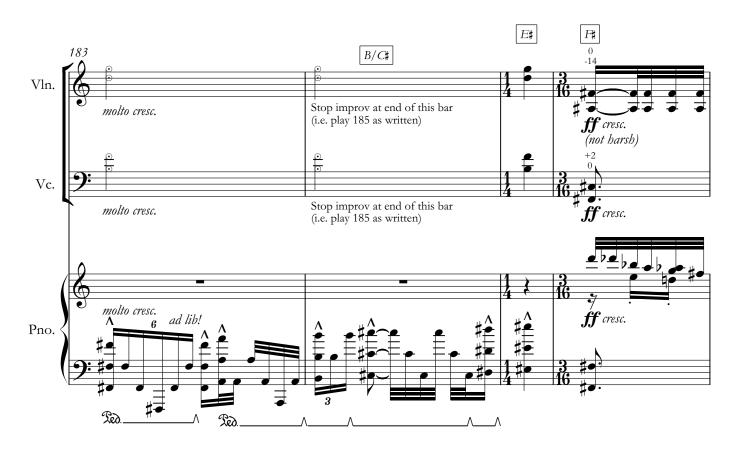


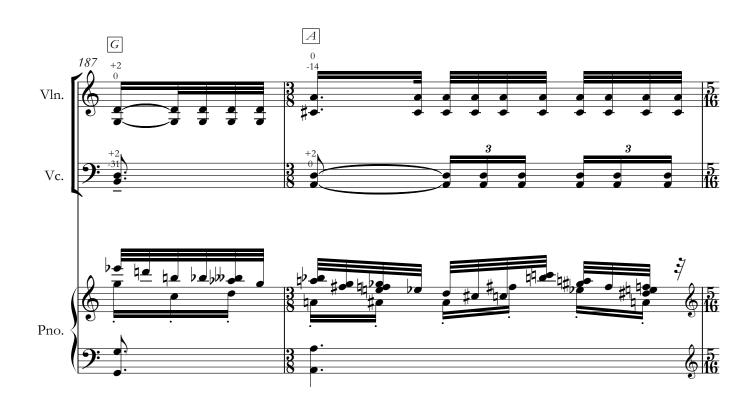
















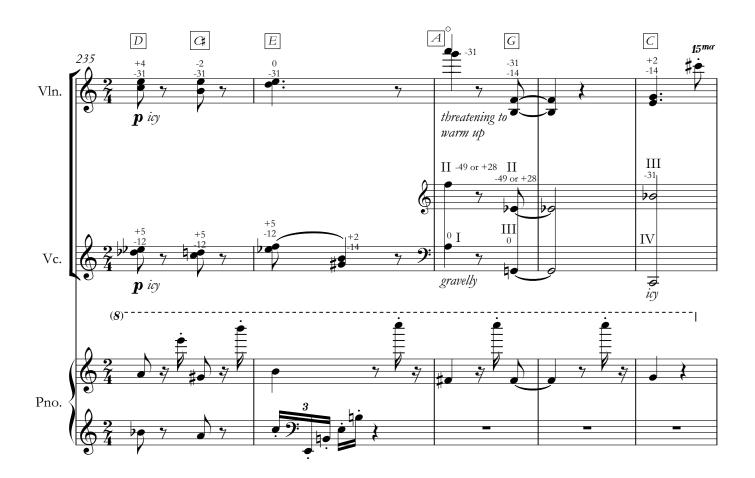




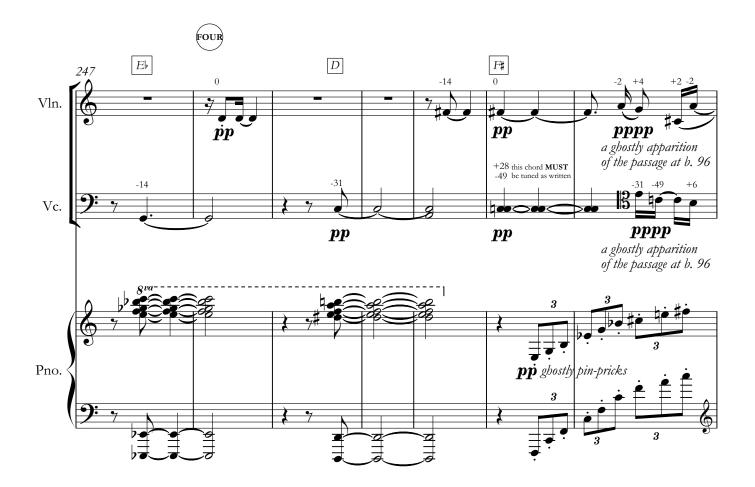


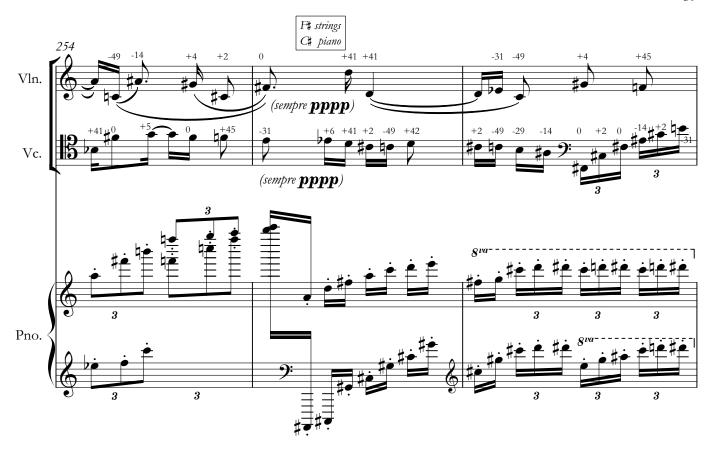


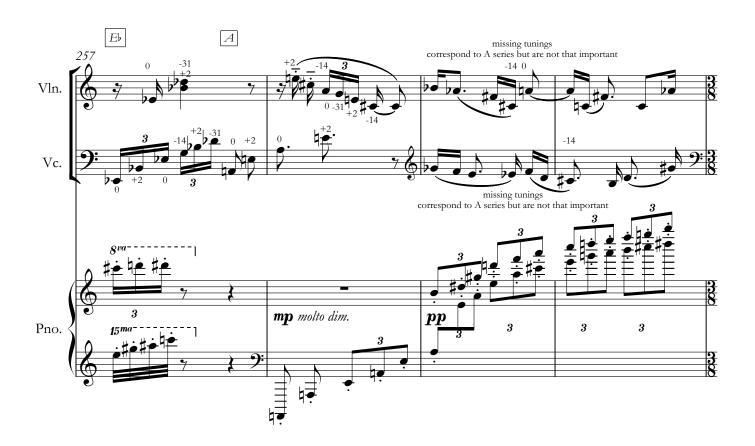






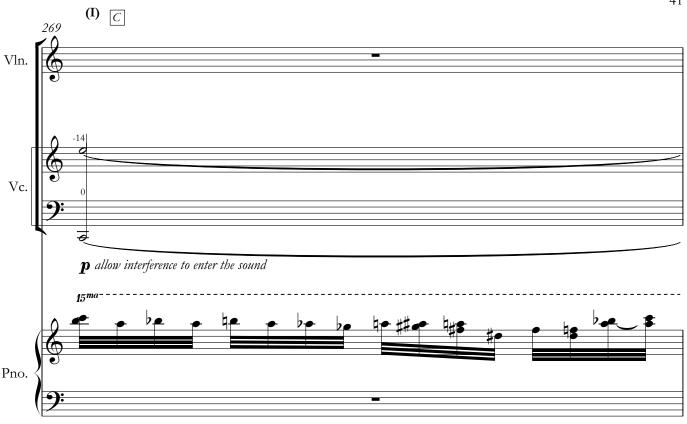




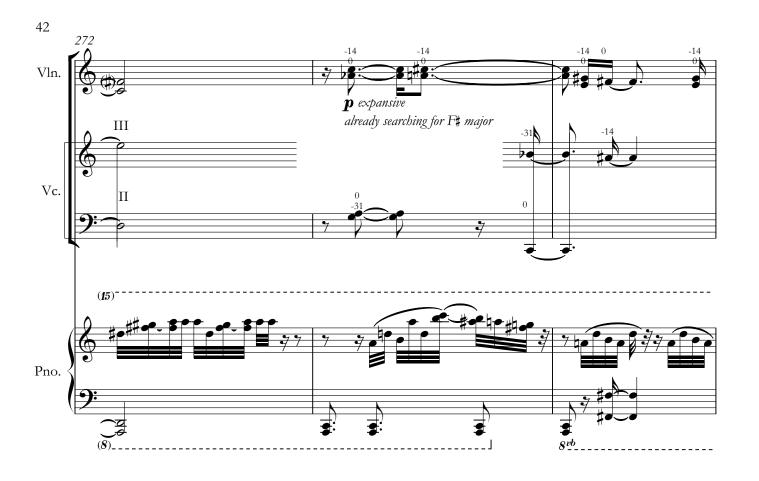


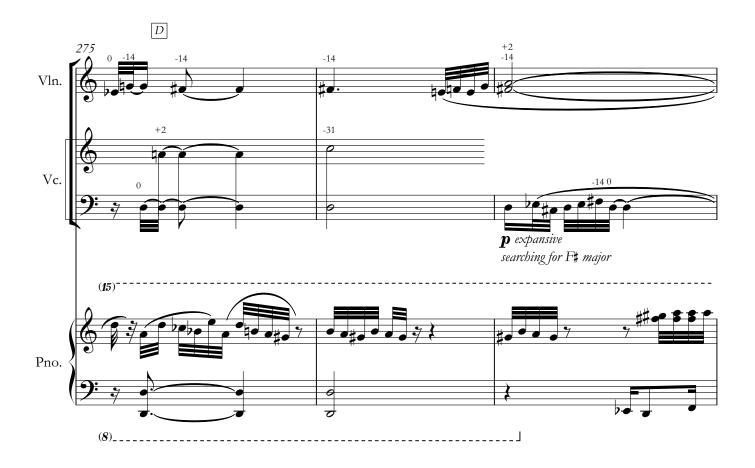




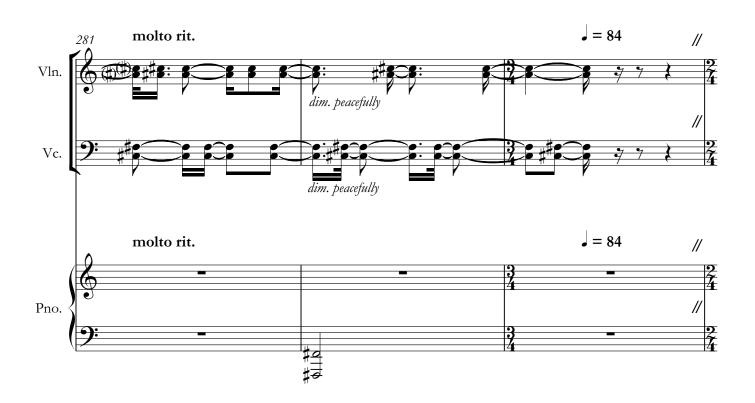






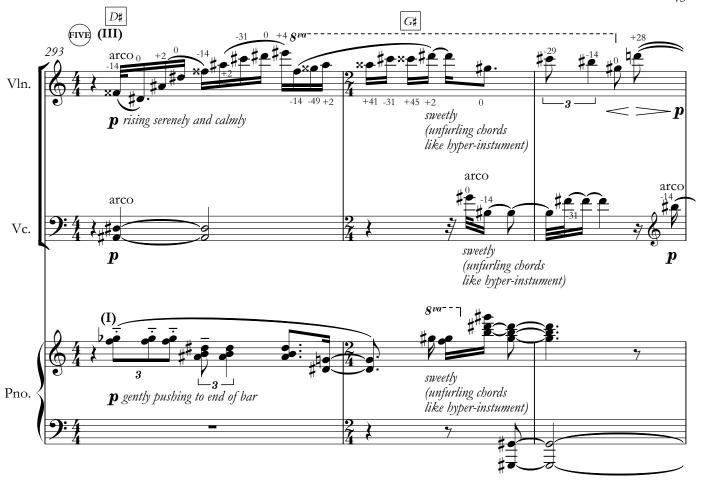


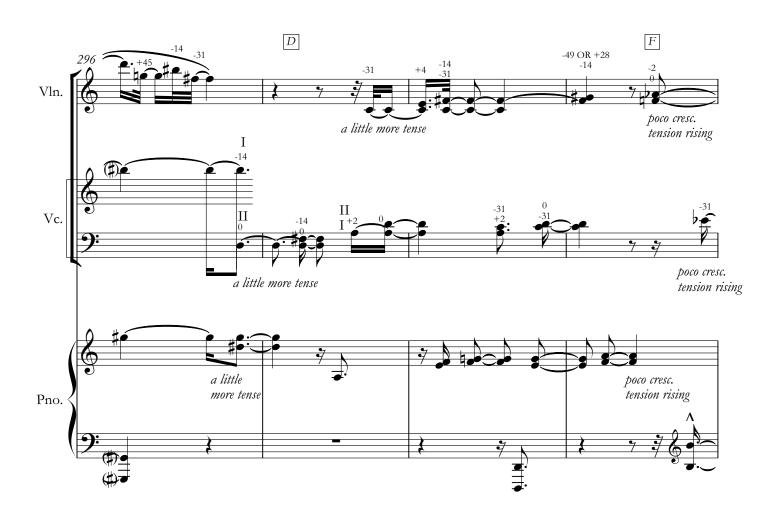


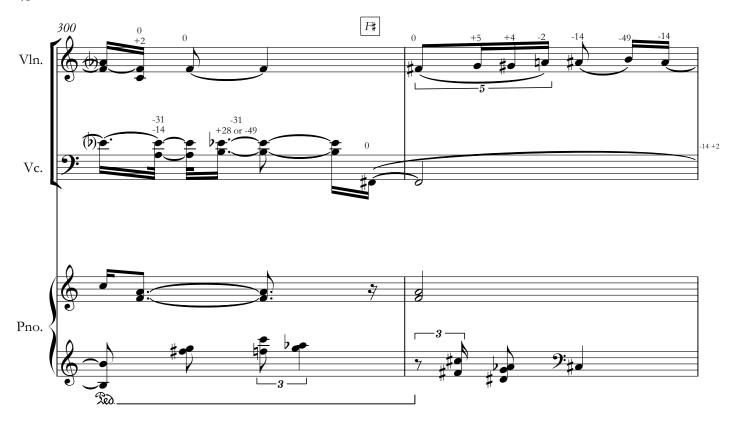


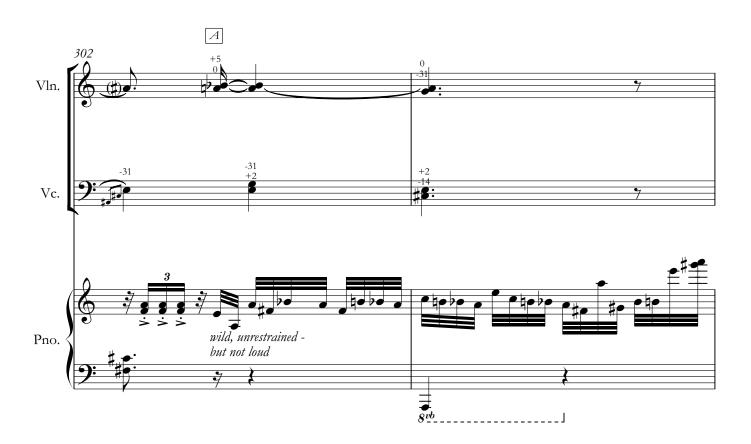




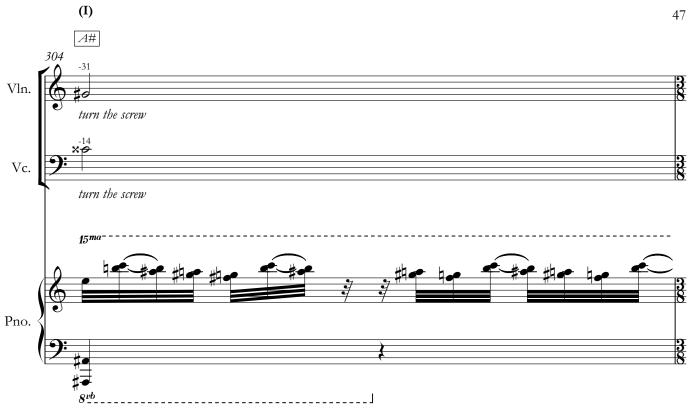


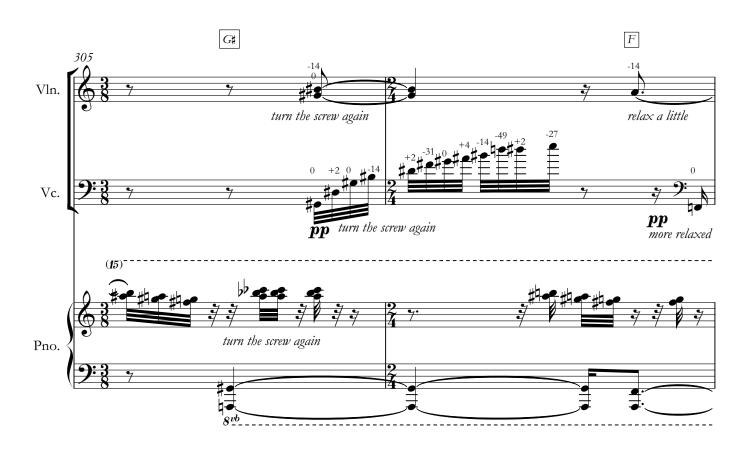


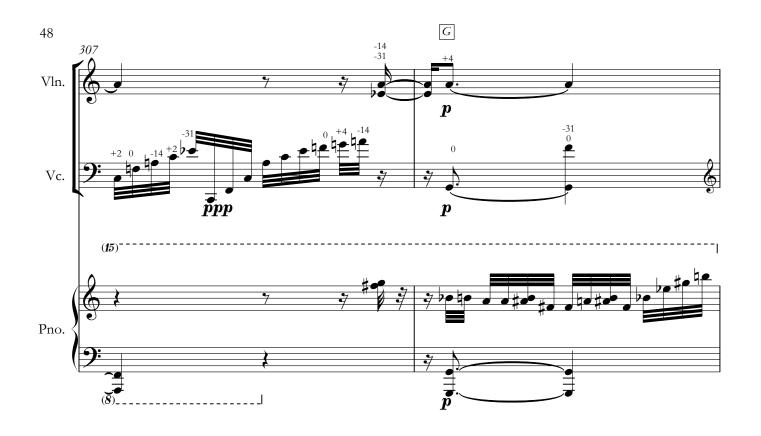


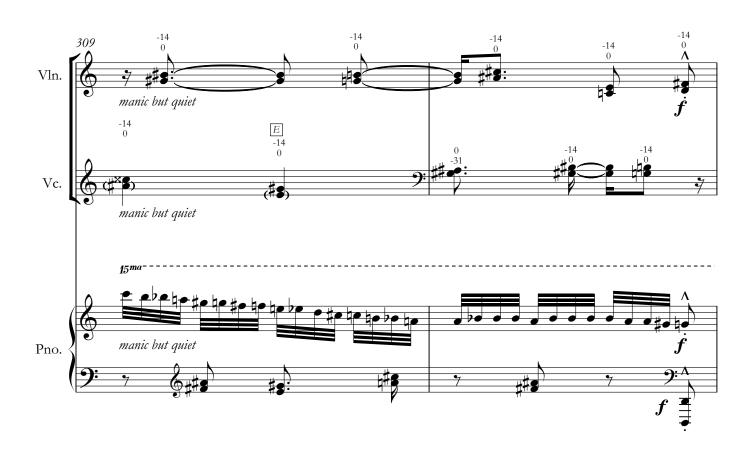








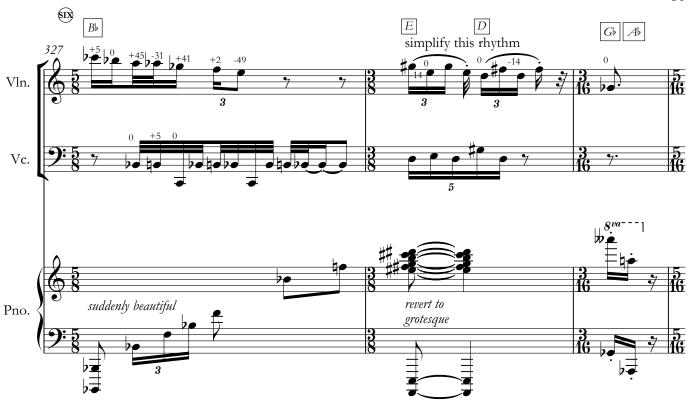


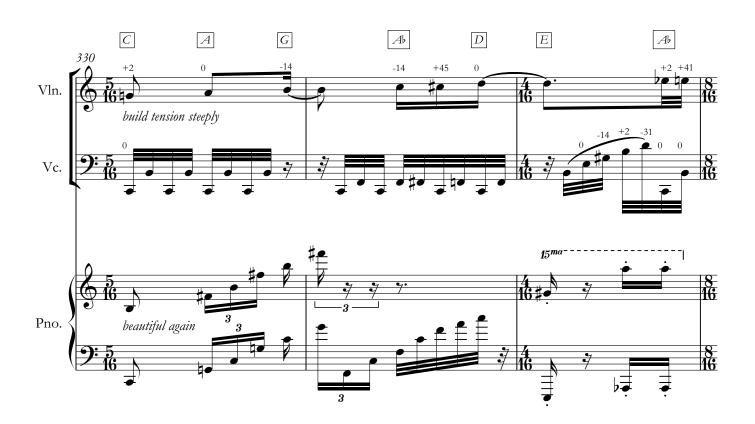


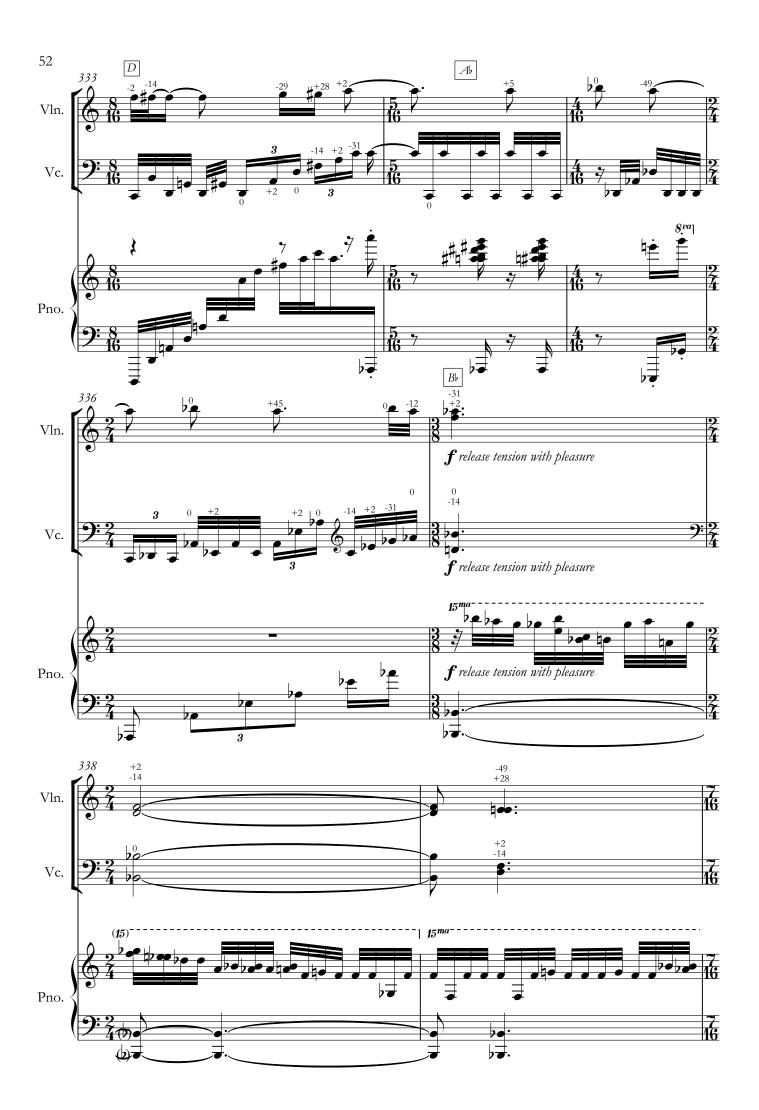


Voice 4 is ossia - but seems to work nicely as a harmonisation of v1!

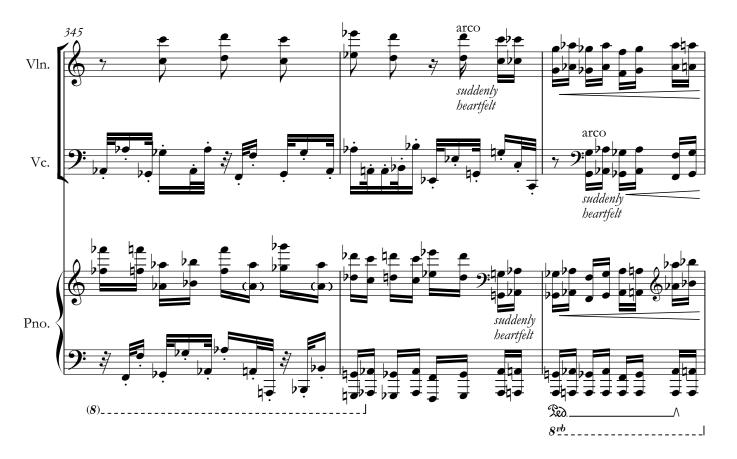


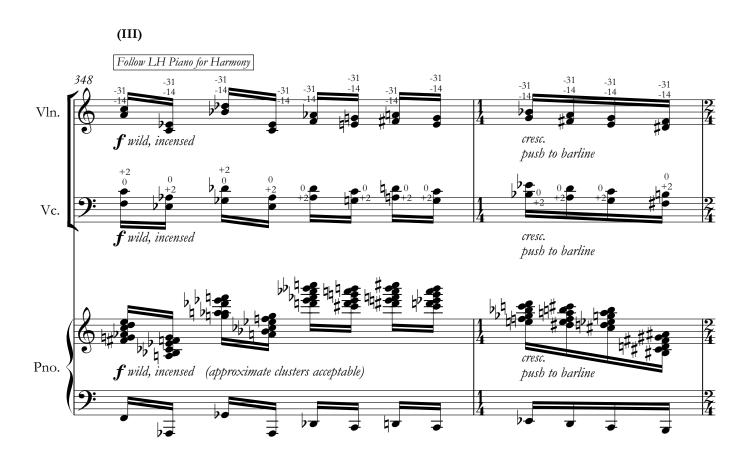




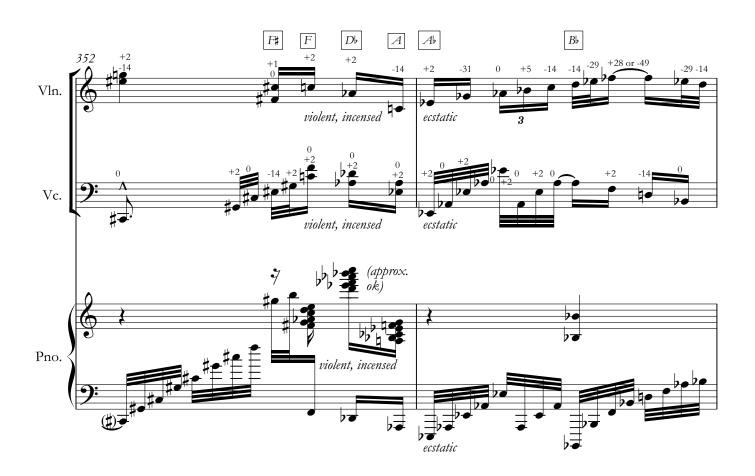


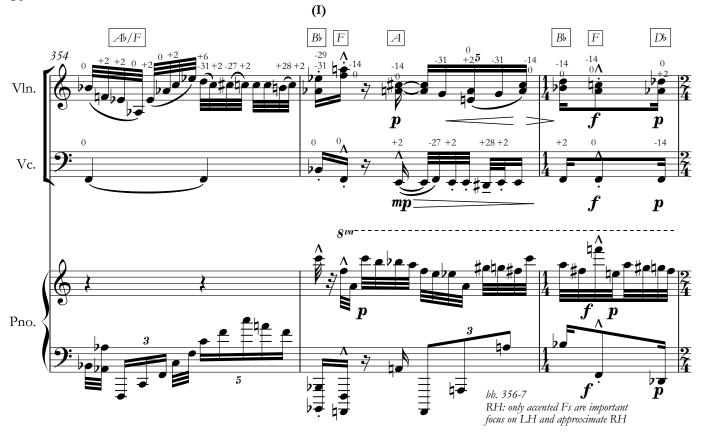


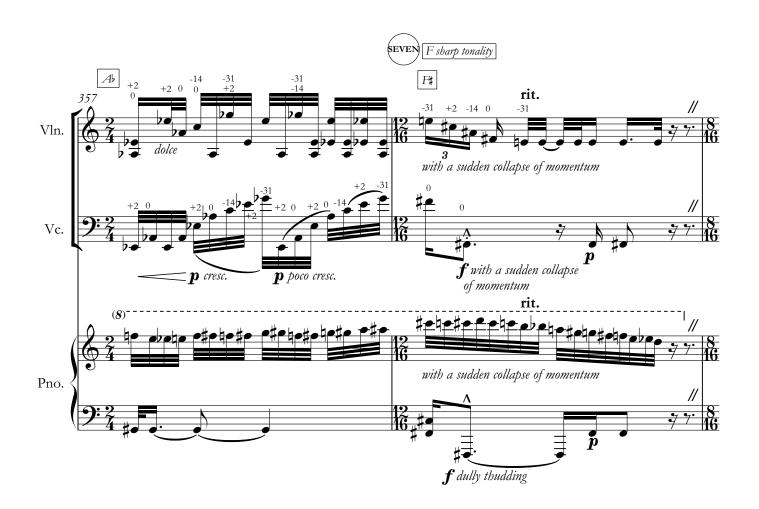






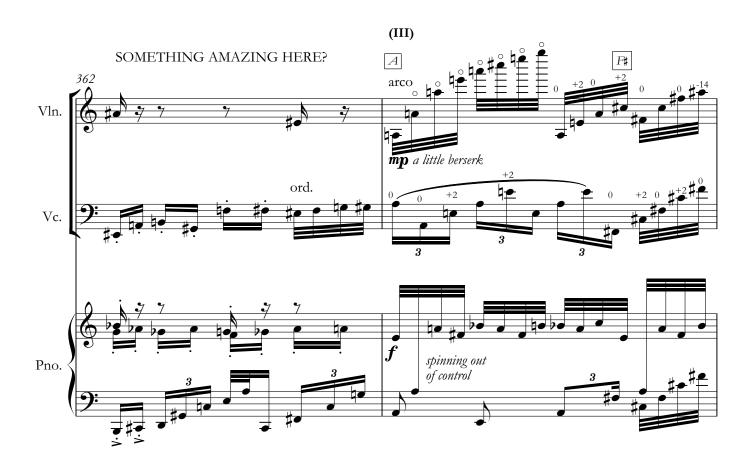


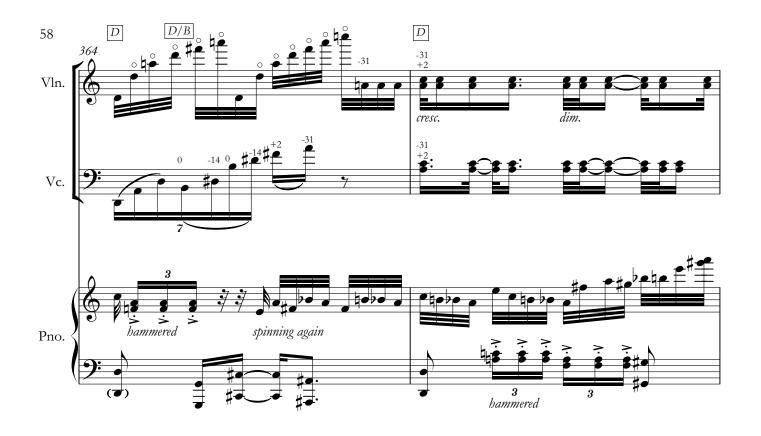




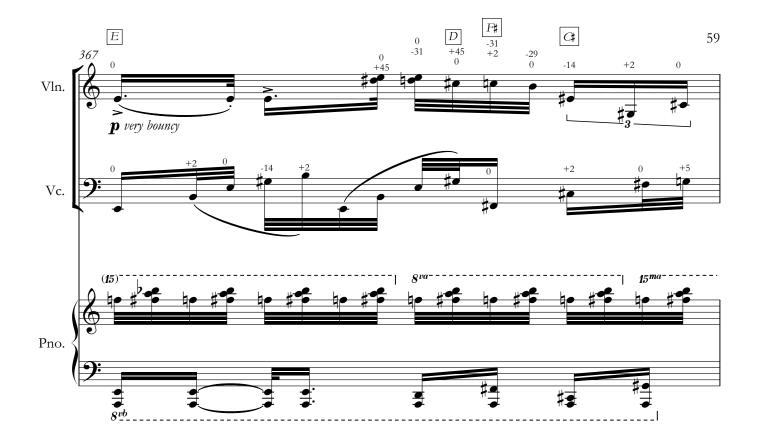


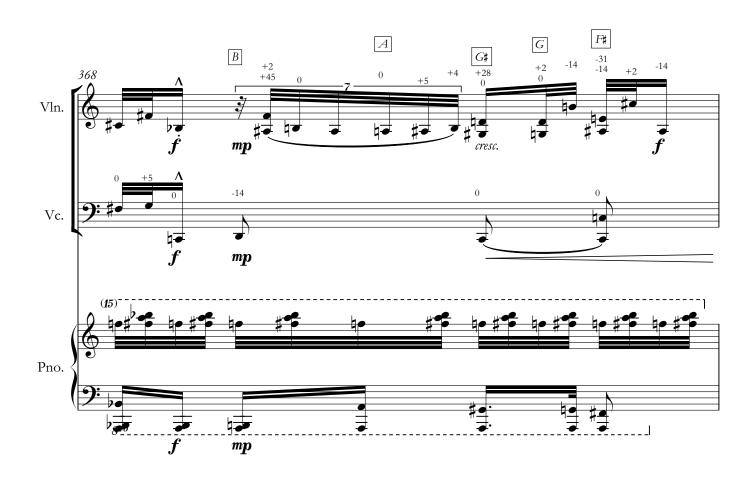


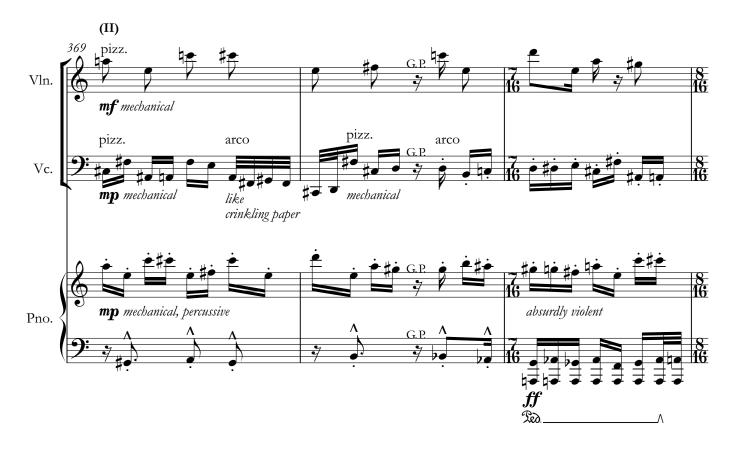








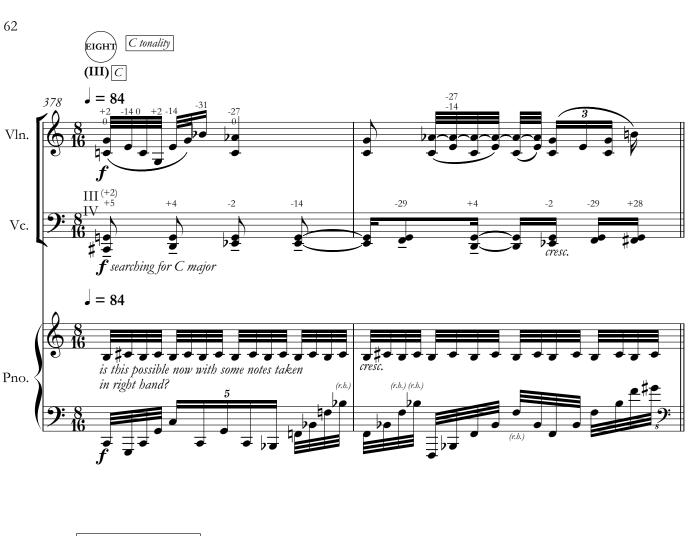


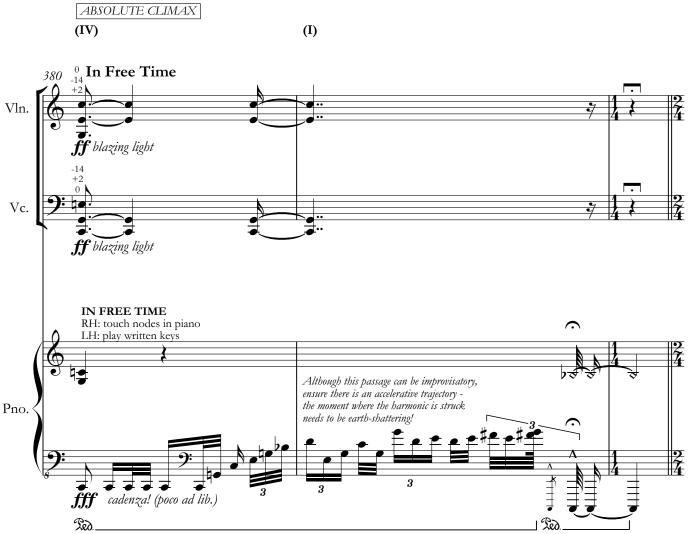


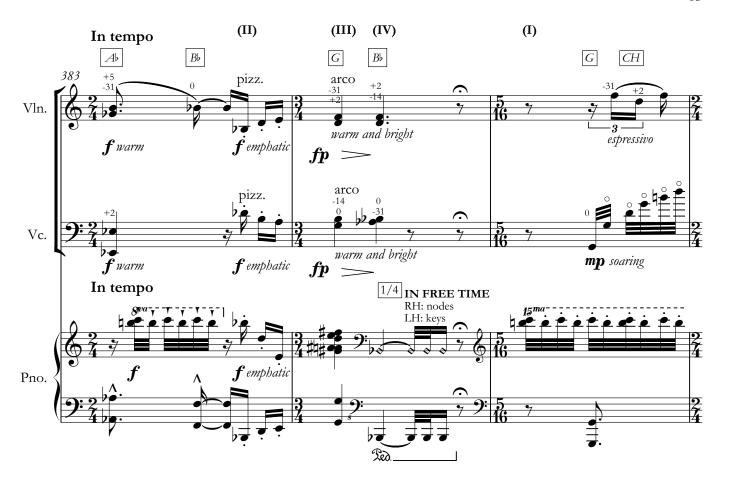




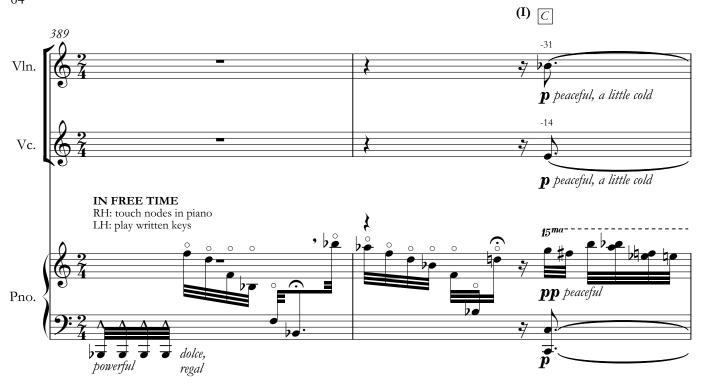


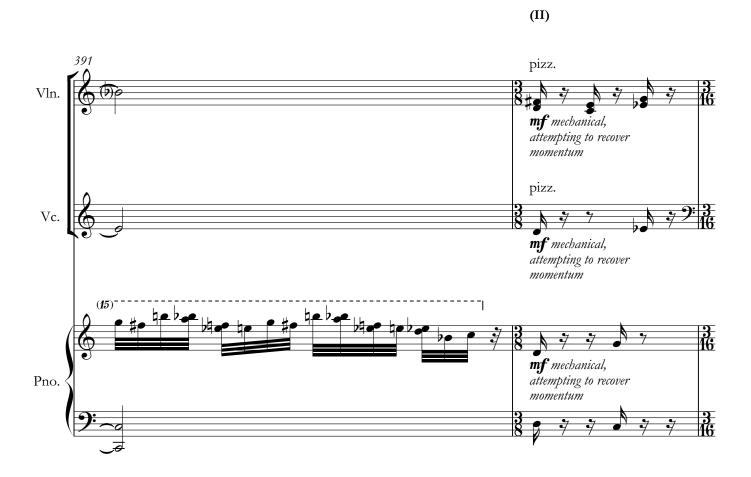




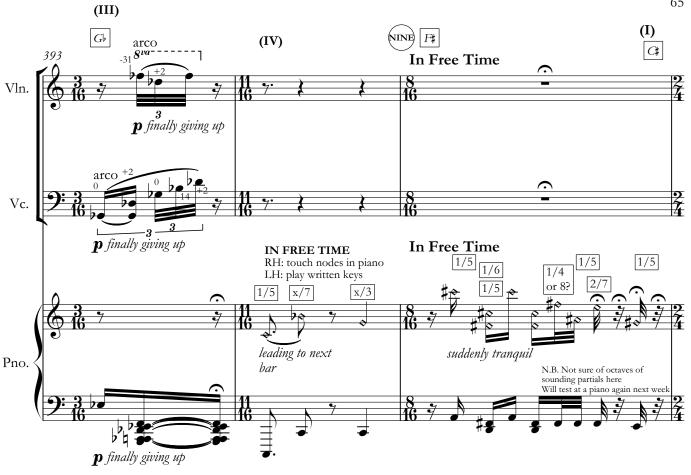


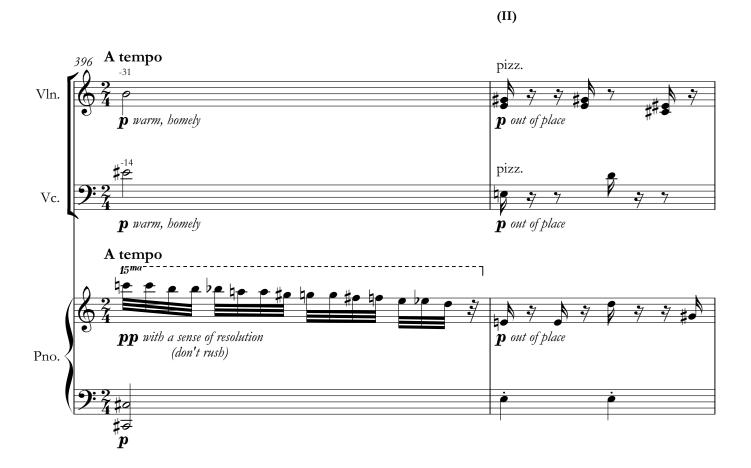


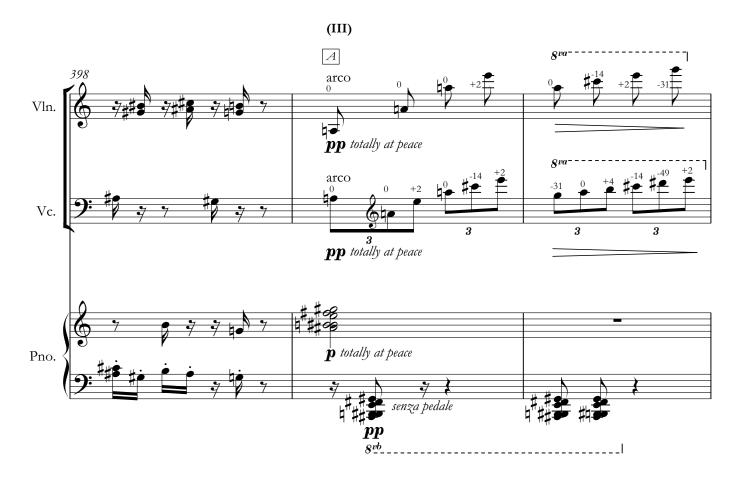


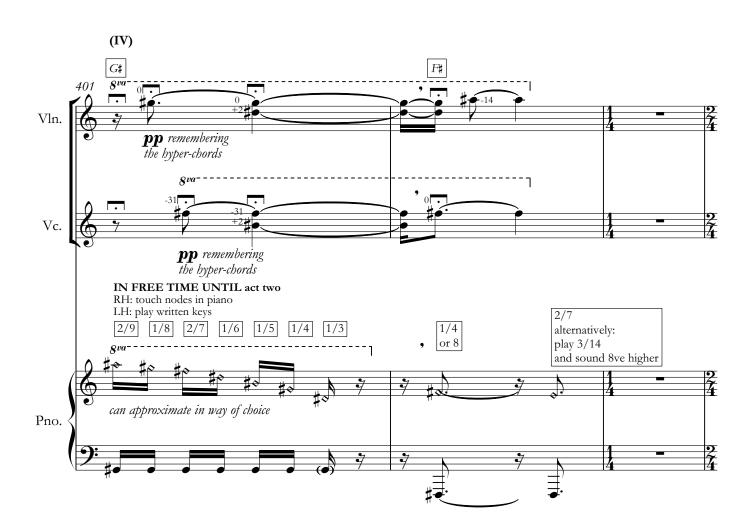


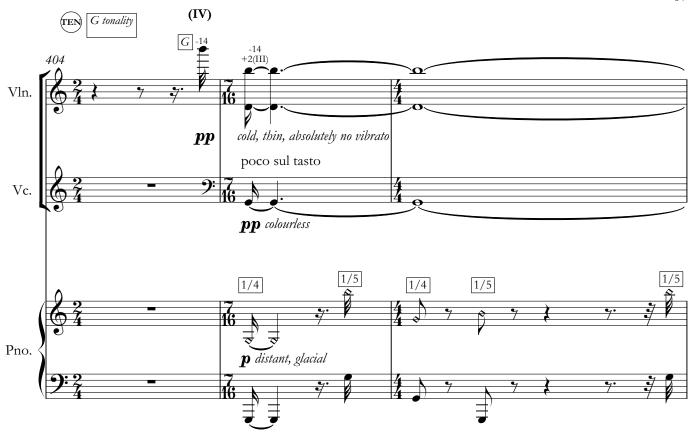


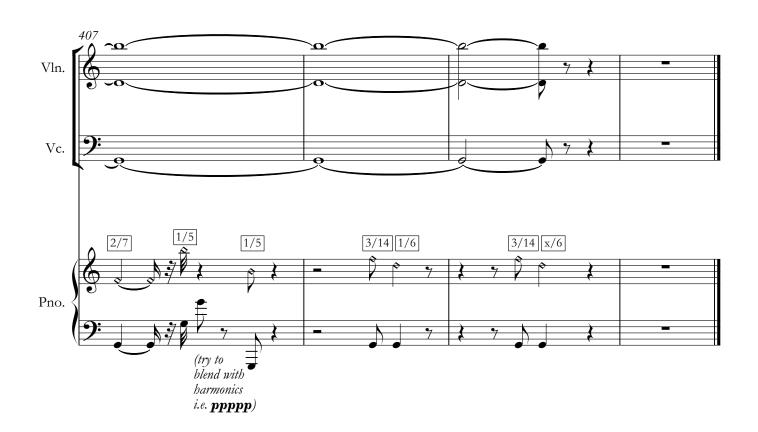


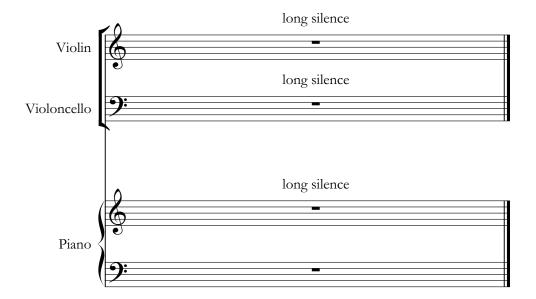




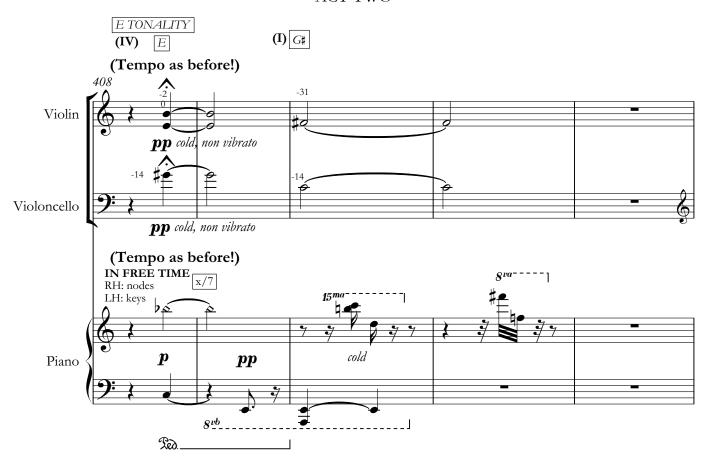


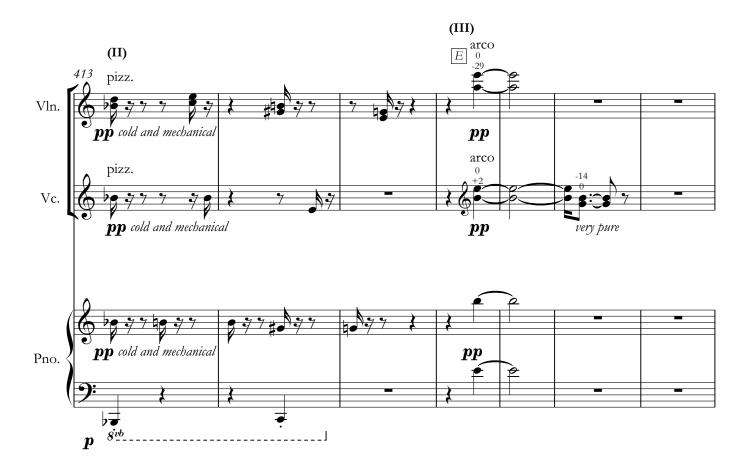


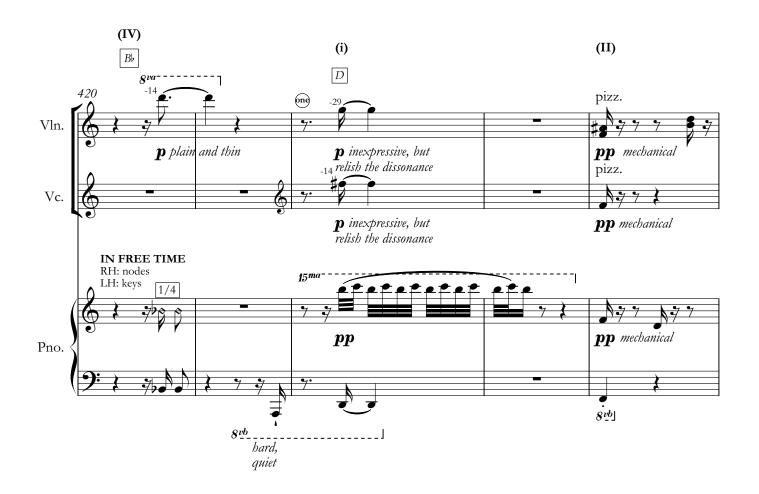


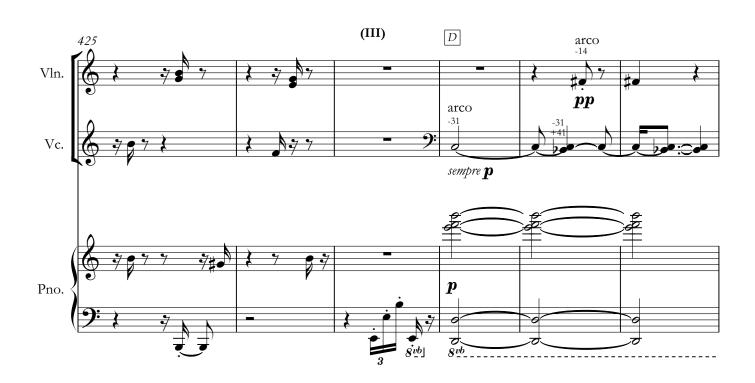


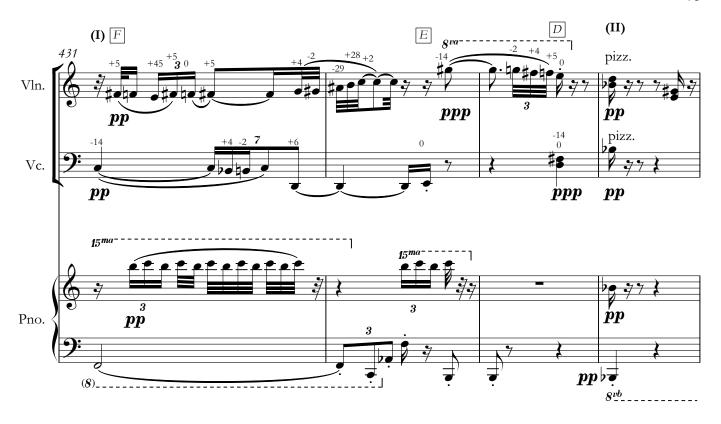
## ACT TWO

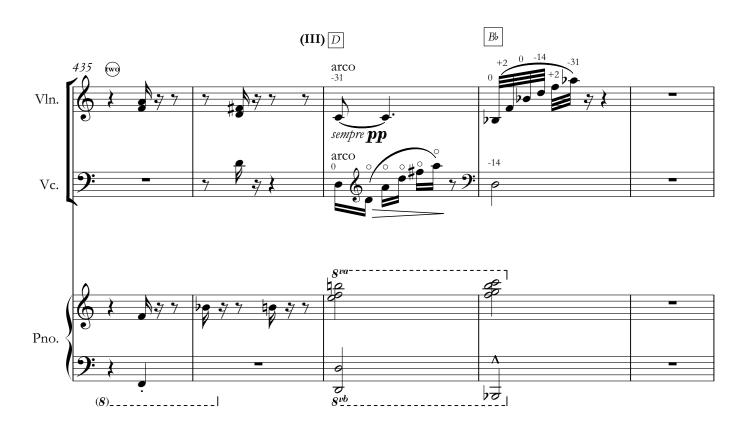




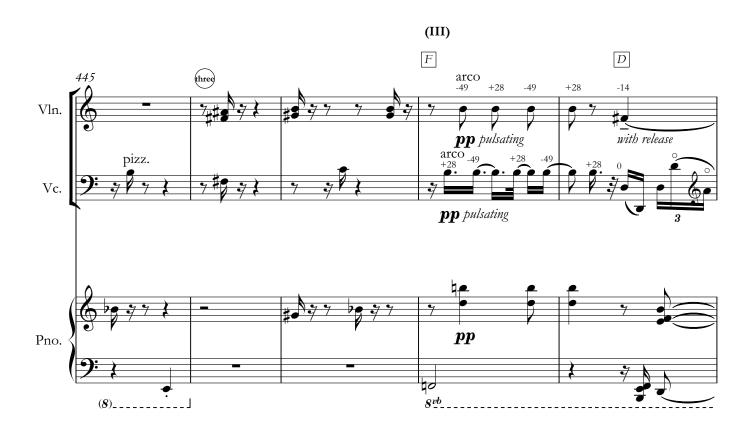


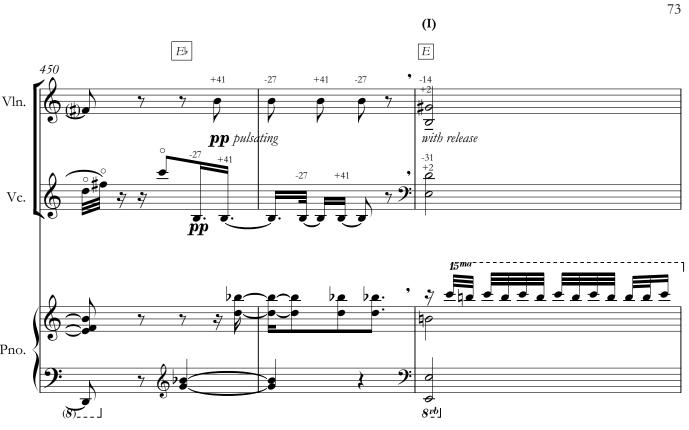


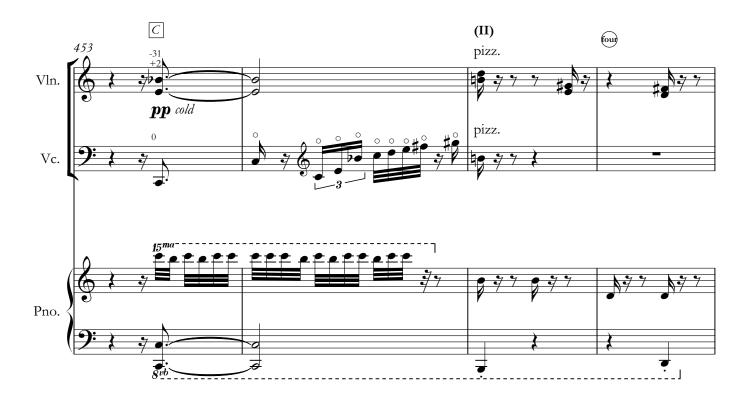




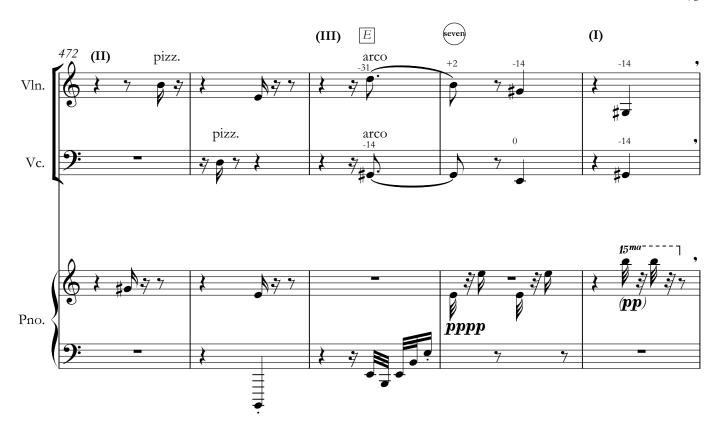


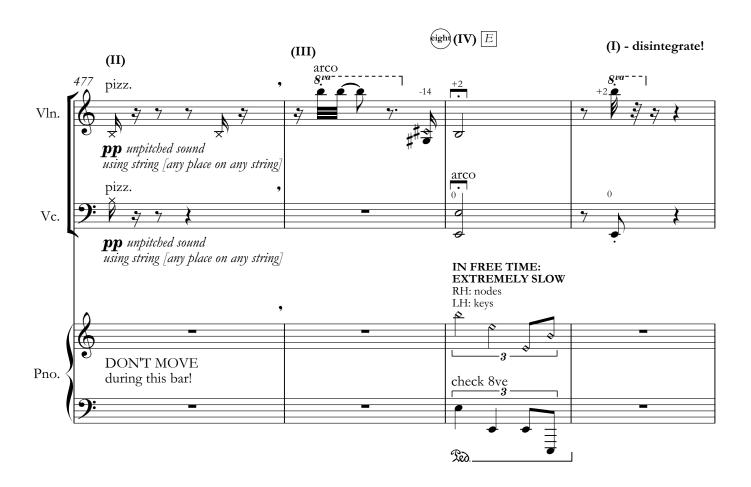


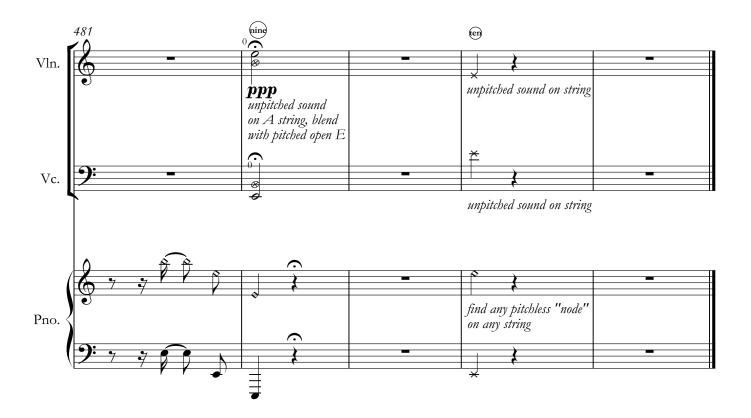












#### 2018.1

#### PERFORMANCE NOTES

# Key:

(ONE)	(Circled number)	Denotes sections of the piece (derived from underlying harmonic structure – not relevant as a
		performance instruction)
G	(Boxed italic text)	Denotes the currently active fundamental pitch. Generally, all microtonal deviations are derived from the active fundamental (see table below).
-14, +41, 0 etc		Deviation from equal temperament in cents.  1 semitone = 100 cents, therefore -31 is approx. a third of a semitone flat etc.
(II)	(Bold, bracketed Roman numerals)	Denotes the type of material in use (see explanation)
1/5	(Boxed fraction)	Denotes the position of piano harmonics (see explanation)
г	(Square Fermata)	In the violin and cello parts, indicates that the pianist has to play harmonics inside the piano at this point (i.e. follow the pianist for timing)

#### **Contents:**

Note on playing techniques (\*\*) p. ii

Tempo **(\*\*\*)** p. ii

Tempo during harmonics sections (\*\*\*)

Tempo in Act Two (\*\*\*)

Use of overtone tuning in the string parts (\*\*) p. iii

Harmonics 1–32 collapsed into one octave (\*\*)

The First 32 Harmonics of the Overtone Series

Explanation of the harmonic series

Tuning and the harmonic series

Piano Preparation and Harmonics (\*) p. vi

Piano Preparation (\*\*\*)

Playing Piano Harmonics (\*)

Notation (\*)

Further Details (\*)

Structure of the Piece p. vii

Overlaid Structures

Material (\*\*\*)

Generative Note Row

Harmonic Structure

Relationship between Acts One and Two

(\*\*\*) = indicates required reading for all performers

(\*) = required reading for pianist

(\*\*) = required reading for violinist and cellist

Remaining material is optional but potentially useful

#### Note on playing techniques:

Normal bow position / playing technique should not be assumed.

Where expressive text is given but no specific playing technique indicated, the player should feel free to achieve the desired result with any kind of bowing/extended technique they wish. For example: the marking 'gravelly' could be executed via sul ponticello bowing, or by varying bow pressure, or in many other ways.

In the violin part, a double-slashed tremolo on a double-stopped note indicates that they are to be played as a very fast slurred tremolo between the two notes.

## Tempo:

Although a metronome mark is given, it need not be adhered to strictly. The semiquavers in material marked (II) in the score should be reasonably fast but in no way rushed.

## Tempo during piano harmonics sections:

In all sections marked **(IV)** in the score (i.e. in all places where the piano plays harmonics inside the piano), tempo should be taken as being entirely free. The violin and cello should note how their parts line up with the piano part in these places and watch the pianist carefully. The pianist is in total control in all these places. Tempo reverts to normal immediately after these sections.

Where there are markings such as 'Push to barline' or 'Held Back', the tempo reverts to normal after the instruction is complete (i.e. it is not a permanent tempo change).

# Tempo in Act Two:

Tempo in Act Two can be freely slowed down at will as the movement progresses. Secondly, all silent moments can be extended indefinitely. It should feel like time grows ever slower as this movement progresses.

# Use of overtone tuning in the string parts:

The piece makes extensive use of pitches tuned in line with partials of the overtone series, throughout all sections of material marked (I) and (III).

These tunings are indicated with small numbers in the string parts accompanied by + or -. All of these deviations from equally tempered tuning are derived through being partials of a local fundamental. As such, the sensible approach to learning the tuning system (if this is new to you) is to get the individual intervals on your ear, rather than purely learning to tune passages from the piece.

In the context of this piece, it may be helpful to think of the harmonic series as an alternative to a chord; in fact, as I wrote, I was thinking this way – rather than a passage being on the chord C, I thought of it as being on the harmonic series of a C fundamental.

The local fundamental is indicated in the score and parts in boxed italic text. Mainly, but not always, the fundamental is included in the played notes (most often in the left hand piano part).

Although the exact tuning desired is written on every note in the relevant sections, some of the smaller deviations from equal temperament can be freely ignored if limited rehearsal/practice time makes that necessary. They are notated anyway, so that the harmony of the piece is clear to the players at all times (e.g. it may be useful to know that your note is a minor 2<sup>nd</sup> above the fundamental, even if you do not aim to play it 5 cents sharp)

The most important interval to actually get right is the major third harmonic, which is a pure third (14 cents flatter than an equally tempered third) and should be a familiar sound to you from baroque and probably quartet playing.

Similarly, the perfect fifth (2 cents sharp) is just a pure fifth and is second nature to string players anyway.

The flat minor seventh (31 cents flat, and made famous in Britten's Serenade for Tenor, Horn and Strings) is also easy to get on your ear and important to get right.

The pure, warm sound of chords using these intervals (perfect major third, perfect fifth, harmonic minor seventh) is very important to the soundworld of this piece. For practical purposes, you will probably want to prioritise these and worry less about the rest.

The more extreme deviations from equal temperament (e.g. augmented fourth, minor sixth, sharp major seventh) can be approximated as quartertones or eighthtones, and by trying to find a tuning that sits well in the chord or passage. As above, the smaller ones can simply be ignored.

I would recommend listening to music such as the opening few minutes of GF Haas' String Quartet No. 2 as part of the process for getting these intervals on your ear.

Tables of the overtones needed for this piece are on the next page.

# Harmonics 1-32 collapsed into one octave:

(Shown with the C series overlaid for illustrative purposes; can be transposed to any other fundamental)

С	Dfl	D	Efl	Е	F	Fsh	G	Afl	A	Afl	В
Fund	min 2nd	Maj 2 <sup>nd</sup>	min 3 <sup>rd</sup>	Maj 3 <sup>rd</sup>	Perf 4 <sup>th</sup>	Aug 4 <sup>th</sup> /dim 5th	Perf 5th	min 6th	Maj 6th	min 7th	Maj 7th
0	+5	+4	-2	-14	-29	-49 +28	+2	+41 -27	+6	-31 (+30)	-12 +45

The intervals required for 2018.1 are listed above.

Row 1: named pitch, for illustrative purposes (assuming series is based on C)

Row 2: interval relative to fundamental

Row 3: all possible tunings for this interval, using the first four full octaves of the harmonic series.

N.B. the sharp minor seventh harmonic is not used in this piece

## The First 32 Harmonics of the Overtone Series:

0	0	+ 2	0	-14	+2	-31	0	+4	-14	-49	+2	+41	-31	-12	0	+5	+4	-2	-14	-29	-49	+28	+2	-27	+41	9+	-31	+30	-12	+45	0
F u	8 v	P 5	8 v	M 3	P 5	m 7	8 v	M 2	M 3	A 4	P 5	m 6	m 7	M 7	8 v	m 2	M 2	m 3	M 3	P 4	d 5	A 4	P 5	m 6	m 6	M 6	m 7	m 7	M 7	M 7	8 v
n d	First 2 <sup>nd</sup> octave 3 <sup>rd</sup> octave 8ve									4 <sup>th</sup> octave										5											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

F = fundamental m = minor M = major d = diminished A = augmented

**Row 1:** deviation in cents from equal temperament

Row 2: interval of harmonic relative to fundamental

Row 3: octave relative to fundamental

Row 4: harmonic number (i.e. its position in the harmonic series)

#### Explanation of the harmonic series:

The harmonic series (or overtone series) is a mathematical and physical concept that underpins both the nature of pitched sounds and the basic intervals used in most (all?) musical cultures.

A simple way to explain the phenomenon begins with taking a taut string (say: a low C, pitched at around 65Hz). When a string is forced to sound, the resulting note is composed not just of the full string vibrating (65 times per second, in our example), but also of many other sound waves.

The frequency of these sound waves can be calculated by multiplying the fundamental frequency by each of the positive integers (1, 2, 3 etc.) in turn. Dividing the total string length by each integer in turn and touching it at that point on its length yields the next audible frequency.

For example: the next frequency produced by the C string is 130Hz (65Hz\*2). This frequency is produced because each half of the string vibrates independently of the full string, and because the frequency of a sound wave produced by a string is in proportion to its length (with faster vibrations producing ghigher notes). We hear this doubled frequency as an octave. The third frequency produced by our C is 195Hz (65Hz\*3). This frequency is produced by the string vibrating at every third of its full length. It produces a pitch we recognize as being an octave and a fifth above the fundamental (which is vibrating three times faster than its fundamental).

Each of these additional frequencies can be called a partial, or overtone, of the fundamental note. The harmonic series continues infinitely, but audible partials are limited by three factors: the limitations of our ears, the physical makeup of instruments and the fact that higher partials vibrate with less energy. [I'm not sure if this is entirely scientifically correct]

Doubling the fundamental pitch successively produces a series of octaves (therefore 65Hz, 130Hz, 260Hz, 520Hz all sound as Cs). As a result of this, each octave of the harmonic series contains twice as many partials as the previous one.

Western harmony developed out of experiments dividing strings into sections that produced pleasing sounds and noticing that dividing them into proportions relating to counting numbers produced consonant sounds, but that is a topic best discussed elsewhere...

#### Tuning and the harmonic series:

The intervals produced by the harmonic series are extremely beautiful, but they cause serious problems in music that requires a fixed keyboard and ventures into different keys.

A note used as a major third in one key would then be flat if used as the fundamental in a following key (meaning that the major third above that will either have to be flattened as well to sound equally beautiful, or left sounding sharp in the original key – either way, one key will not be tuned to the harmonic series).

Because of the need for composers to modulate, equal temperament gradually developed. The great loss of these pure intervals can be heard by comparing equally tempered instruments to choral singing, historically informed performance of baroque music etc. and there are many movements by contemporary composers to find ways to reintegrate tunings based on the harmonic series into classical music.

The approach used in this piece reconciles equal temperament and overtone tunings, using the conflict between the two incompatible systems as a musical tool.

#### PIANO PREPARATION AND HARMONICS

#### Preparation of piano:

The top octave of the instrument (C to C) should be prepared with soft fabric draped over the strings so that the sound is heavily damped/muted, <u>but still clearly pitched</u>. There should be next to no sustain on these notes. This could be achieved with cloth weighed down lightly, or with several layers of heavy cloth.

The second-highest octave should be damped more lightly, so that the sound is halfway between the prepared top octave and the normal sound of the rest of the instrument. This can be achieved with a single layer of clothing (e.g. a jumper) without weight applied.

## Playing piano harmonics:

Piano harmonics (played inside the piano) are used in the piece. The player should mark the dampers of relevant strings for easy reference and may also wish to mark nodes (e.g. with tiny pieces of paper tape or small pieces of yarn.

Piano harmonics are played with one hand touching a harmonic node on a string of the instrument, with the other hand depressing the key. Generally, the pedal should be held down in passages featuring piano harmonics.

#### Notation:

The harmonics are notated in the following way: the bottom stave of the piano part features the keyed note, and a diamond notehead on the staff above notates the desired sounding pitch. Over this is a a boxed fraction x/y. In this fraction, the most important number is the denominator (y), which indicates the sounding partial.

The entire fraction represents the exact position of the harmonic on the string, relative to the player's end of the string. For example: the fraction 2/7 indicates that the required node is two sevenths of the string length away from the player and will sound as a seventh harmonic. This harmonic could also be sounded 3/7, 4/7 etc. down the string – but these are less easy to reach.

## Further details:

Different harmonics work well on different pianos (in terms of both sound and accessibility). Because of this, the player should take license to swap a harmonic for one which sounds at the same note, if they are struggling to reliably reproduce the required note. Any harmonic multiplied by 2 will sound an octave higher. This means that x/14 is an octave higher than x/7. Transferring harmonics up or down an octave is acceptable in 2018.1 when it does not disrupt a melodic line. This is relevant to the following harmonics used in the piece: 1/6 & 1/3; 2/7 & 3/14; 1/8 & 1/4.

The following harmonics are used in the piece, on various fundamental strings: 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup>, 14<sup>th</sup>, 15<sup>th</sup>

Of these, all but the 15th can be found within the space of about eighteen inches in front of the dampers (further than the dampers from the player) on a Yamaha C3. I intend to check on other pianos if possible.

The 15th harmonic is used once, on the lowest C of the piano, and can be found a couple of inches behind the dampers, in a very dense area of harmonics – it has a very strangled sound.

Excellent diagrams and information can be found at pianoharmonics.com and further information and advice can be obtained from the composer at sebastian.adams@hotmail.com

#### Structure of the piece:

#### Overlaid structures:

2018.1 unfolds several structures of varying complexity simultaneously.

The simplest structure is the relationship between the two movements (or Acts) of the piece, which are closely modelled on one another but very different in size and impact.

Two complex structures are articulated by the material (with alternating sections that get longer towards the middle of the piece) and long-term harmony (beginning with extremely long sections and gradually shortening them.

The harmonic and material structures have two overlapping points (firstly: the first global change in harmony happens at the moment that the pockets of material begin to get longer; the second is discussed in the next paragraph) but other than this they are not synchronised.

Alongside these formulaic structures is a more intuitively figured out goal-driven structure which controls the ebb and flow of musical tension. This structure is framed around two climaxes, which are both linked to important structural points in the material and harmony. The first is around bb. 153–200, led in from around b. 140. The centre of this climactic area is the point at which the pockets of material are at their longest, and it takes up the tonal section labelled 'TWO'. The second climax (b. 378) could be thought of as the absolute climax, and it combines the arrival of tonal section 'EIGHT' (in C major) with the return to the shortest pockets of material, and also the reintegration of material type (IV).

Although the note row (discussed below) is the essential driver of the harmonic structure, it can also be thought of a structural device in its own right. I believe it delivers an audible impression of their being some sort of internal logic driving the piece along – this is made especially obvious in sections (II), where the logic is brought to the surface of the music.

## Material:

2018.1 uses four distinct types of material, which are presented in consecutive order repeatedly throughout the entire piece.

Material and Structure:

Material type (IV) is used only at the start and end of each movement, serving as an audible structural marker. Outside these sections, the order is: (I) (II) (III) (II) (III) etc.

The sections of material begin as fragments and get gradually longer towards the middle of the piece, reaching a maximum length of around 32 bars per section before fragmenting again as the end approaches, blurring the line between local phrasing and global structure. A similar process occurs in the short second movement.

All four kinds of material are derived from stage directions from the opening page of Beckett's *Happy Days*. These directions are paraphrased below for reference. The material types/sections are denoted throughout the score with the markings (I) (II) (III) and (IV), but will be immediately obvious anyway.

(II) should be seen as a disruptor of (I) and (III), getting in the way of their relatively coherent dialogue. (IV) should come from an entirely different temporal world, totally stopping the progress of the piece whenever it appears.

Each of the material types undergoes radical changes from the descriptions below, but these lines of text should be kept in mind throughout.

(I) expanse of scorched grass rising

- low fundamentals played in left hand of piano
- muted, very high fast notes in piano, spinning out of the rest of the material
- spectrum of fundamental notes filled out by strings playing partials

#### (II) maximum of simplicity and symmetry

- very mechanical music, directly quoting and transforming the generative note row (see below), for example with canons, inversion etc.
- it is very important to note (see structure, above) that the internal logic of the piece is being brought to the surface in (II). This is reflected in the expressive text, and should be in your thoughts as you play it.
- uses standard tuning (i.e. not overtone tuning, but not necessarily precisely equally tempered)

(III) blazing light

- generally more sonorous, dense chords

(IV) pauses, bells, gazes

- piano harmonics; time stops; very little happening in the string parts
- the tonal landscape of piano harmonics is different again from both standard tuning and overtone tuning.

## Generative Note Row:

The words of the Irish folk song Óró, sé do bheatha 'bhaile were used to create a long series of notes which formed a grid on which the whole piece sits. Every event in the piece is developed from a note taken from this grid, and each of these events occurs at the rhythmic position of the note from the note row. In (II), sections are taken verbatim from the note grid and then processed (see Material). Elsewhere, a single note from the row is generally used as the seed (mostly the piano fundamental) for an entire phrase.

The folk song includes a chorus which repeats the title three times, thus forming a distinctive pattern of notes. This chorus figures large in the final piece and was used as a defining presence in the harmonic structure of the piece (see <u>Harmonic Structure</u>).

The entire song contains 612 letters (or notes), and the repeated motif in the chorus lasts 21 notes. A larger structure is created using these as a base (again, see <u>Harmonic Structure</u>)

The letters of the Irish alphabet were converted to pitches in an arbitrary fashion, with each letter mapped to a pitch between 0-11. I created a Max patch (*with bach.score object*) to convert the text into numbered notated pitches.

The idea to use a generative note row in this manner came from attending an analysis seminar on Beat Furrer's Piano Concerto given by a student at Columbia University in March 2018 (unfortunately, I can't remember his name). I began working on the piece just after this.

#### Harmonic Structure:

In the first movement, the generative note row is repeated over and over, with sections cut from the start and end with each repetition. In this fashion, the note row is gradually reduced from 612 notes until it lasts the 21 notes of the repeated motif (or chorus) discussed above. Each of these sections is a harmonic region (i.e. it is based on a home pitch), and therefore there is a gradual progression from extremely long/stable harmonic regions to extremely short ones over the length of the entire first movement. The individual note-row sections (11 in total) are transposed, using the uniquely occurring pitches from the chorus. The order of the transposed sections is derived by arcing outwards from the E [the tonic note of the note row in its original transposition] that appears at the centre of the chorus (a coincidental, but rich occurrence) – so that the global harmonic structure of the piece reflects the chorus material. F sharp is repeated a second time as there are more pitches on the opposite side of the arc, and F sharp occurs joint most-often in the original chorus.

These sections are denoted in the score by spelled out numbers enclosed in a circle (see **Key**)

#### Chorus:

F#G#F#AG#F#FEBGDBbBDEBDCDG

## Unique notes of chorus, in order of appearance:

F# G# A F **E** B D Bb C G

Including a mistake, where G is left out of its actual first appearance -I can't recall whether this is simply an error or if I had a reason for this, but the final structure of the piece reflects this error/forgotten manoeuvre

# Harmonic structure of Act One, arcing the unique chorus notes outwards from E in order of appearance:

 $\mathbf{E} F B A D G B B F C F G G \mathbf{E}$  (act two)

Act Two is made up of one full instance of the note row (612 notes), and therefore the same mechanism could not be applied in it. Instead, I mapped the exact sizes of each tonal section of the first act on to the original note row, and divided the piece into sections based on that. At each section, I excluded a note. At the beginning of the movement, C# and D# are already excluded, as they are no present in the tone row. Notes are then excluded until gradually only an E major chord is left. Eventually, no notes remain at all. The notes are removed in the order they appear in the harmonic series of E, which achieves the dual purpose of linking the tonal language and structure of the piece together, and of bringing about a gradual and systematic rejection of dissonant intervals.

This order is as follows:

 $[C \not\equiv D \not\equiv] A G F C Bb F \not\equiv D G \not\equiv B E$ 

The final bars of the piece consist purely of unpitched noise.

#### Relation between Acts One and Two:

The reason for act two's harmony being a microscopic version of act one is that the structure of the piece is modelled on ideas from Beckett's plays *Happy Days* and *Waiting for Godot*, which I was reading as I started writing the piece (spurred by the commission for the Beckett Series). The former comprises two acts of disproportionate lengths, and the proportions of my piece are modelled on that (somewhere in the region of 4:1 in favour of act one). In *Godot*, the second act essentially presents the same sequence of events as the first (like my piece). From *Happy Days* again, the fact that the second act is bleaker (emphasised by Winnie sinking even further into the ground when the act opens) led me to the idea that the second act should take the most fragmentary moments of the first as its starting point and take them to an extreme point.