

57

for jim, ben and lou
Three pieces for harp, guitar and percussion

III. The World's Longest Melody (trio version)
"The Ever-Widening Halfstep"

III. *The World's Longest Melody (trio version)*
"The Ever-Widening Halfstep"
 for Lou Harrison

The first note of each beamed phrase is accented. There are five sections, each with a pause (whose length is determined by the ensemble, but not more than a second or two) between them. The piece starts loud, gets very loud towards the middle, and then returns to loud by the end.

The tempo is as fast as possible. At quarter-note = 220 (eighth = 440), the piece lasts around three minutes.

The percussionist plays tuned handdrum(s). The part is improvisational, except that the metric patterns correspond closely to the melodic groupings. For each grouping, both a number and a rhythmic duration are given to guide the percussionist. The percussionist should creatively use different subdivisions of the grouping along with different "melodic" drumming patterns. For example, a grouping of 10 might be divided by low-drum (3), middle-drum (4), high-drum (4). The drum part's "complexity" follows the dynamic curve of the piece, starting simple, becoming more complex to the middle, and becoming simpler towards the end. The percussionist should be much quieter than the melody.

The harp tuning is the same as in Movement II, except that now the 7/6 G is treated (compositionally) as 1/1. All F's in the score are F#'s (for the harp).

Harp Tuning

\ from D below the bass clef staff

0: 7/4	969	--	D
1: 1/1	0	231	E
2: 8/7	232	232	F#
3: 6/5	316	84	G
4: 4/3	499	183	A
5: 3/2	702	203	B
6: 8/5	814	112	C
7: 7/4	969	1	D

\ E below middle C

8: 1/1	0	231	E
9: 9/8	204	204	F#
10: 7/6	267	63	G
11: 21/16	471	204	A
12: 3/2	702	231	B
13: 49/32	738	36	C
14: 7/4/	969	231	D

\ E above middle C

15: 1/1	0	231	E
16: 35/32	156	156	F#

17: 6/5	316	160	G
18: 4/3	499	183	A
19: 32/21	730	231	B
20: 8/5	814	84	C
21: 15/8	1089	275	D#

\ E on top of treble staff

22: 1/1	0	111	E
23: 9/8	204	204	F#
24: 7/6	267	63	G
25: 21/16	471	204	A
26: 3/2	702	231	B
27: 49/32	738	36	C
28: 7/4	969	231	D

\ E three ledger lines above staff

29: 1/1	0	231	E
30: 8/7	232	232	F#
31: 6/5	316	84	G

GUITAR TUNING

The guitar is tuned around the $G = 7/6$, which is the fundamental (1/1) of the piece. The open strings are tuned to it as a $7/6$ minor third (II), a $7/4$ minor seventh (I), an $11/8$ tritone (IV), a $17/8$ minor second (V), and a $13/8$ sixth (VI). All of these intervals are placed in their appropriate octaves.

Only eight different fingerings are used for the guitar part. Stopped octaves, fourths and fifths are used for pitches which are approximations of $4/3$'s and $3/2$'s (within two cents) above the open tuning. Octaves are played as harmonics or stopped pitches. Double octaves and "double" fifths are played as harmonics. "Double fourths" (a fourth plus an octave) are played on the 17th fret.

The notation for the fingerings is as follows, with the example of all of the notes possible on the 3 (circled in the score) string:

III ₀	open string ($G = 7/6$)
III ₁₂ or III ₁₂ ^o	stopped or harmonic at 12th fret ($G = 7/6$)
III ₅ ^o	double octave harmonic ($G = 7/6$), 5th fret
III ₅	perfect 4th, stopped at 5th fret ($C = 14/9$)
III ₁₇	perfect 4th plus an octave, stopped at 17 fret ($C = 14/9$)
III ₇	perfect 5th, stopped at 7th fret ($D = 7/4$)
III ₇ ^o	perfect 5th plus an octave, as harmonic, 7th fret ($D = 7/4$)

In other words, the "tablature" below each actual pitch gives string numbers in Roman numerals with fret numbers subscripted in smaller Arabic numerals. In the score, harmonics are indicated above the note itself, not with Arabic numerals. The guitar is written in the

score in its usual notation, sounding an octave below where written. In certain rare cases, when preceded by a 17th fret fingering, the guitarist may actually find it easier to play the double octave harmonic high on the neck (over the sound hole) than on the 5th fret.

The smaller staff, the "resultant," shows the combined harp/guitar melody. Only the diatonic note names and accidentals are shown on this staff (and not the specific tuning for each pitch).

The complete guitar tuning, with all possible pitches (in only one of their octaves), is as follows:

open strings

(also possible as octave and double octaves)

<i>String</i>	<i>Ratio</i>	<i>Cents (to E 1/1)</i>	<i>Name</i>
VI:	91/48	1108	Eb (13/8 * 7/6)
V:	119/96	372	Ab (17/8 * 7/6)
IV:	77/48	819	C# (11/8 * 7/6)
III:	7/6	267	G ("1/1")
II:	49/36	534	Bb (7/6 * 7/6)
I:	49/48	36	F (7/4 * 7/6)

fourths

("4/3" to open strings: fifth fret and 17th fret)

<i>String</i>	<i>Ratio</i>	<i>Cents (to E 1/1)</i>	<i>Name</i>
VI:	91/72	406	Ab (4/3 * 13/8 * 7/6)
V:	119/72	870	Db etc.
IV:	77/72	117	F#
III:	14/9	765	C
II:	49/27	1032	Eb
I:	49/36	534	Bb

fifths

("3/2" s to open strings: seventh fret and harmonics)

<i>String</i>	<i>Ratio</i>	<i>Cents (to E 1/1)</i>	<i>Name</i>
VI:	273/192	610	Bb (3/2 * 13/8 * 7/6)
V:	119/64	1074	Eb etc.
IV:	77/64	321	G#
III:	7/4	969	D
II:	49/48	36	F
I:	49/32	738	C

Complete Tuning

The following is the complete, "interlaced" tuning for the piece. The tuning is given in the following order:

ratio note name	absolute cents octave	adjacent cents fingering (if guitar)	instrument
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Note: Octave 0 starts on the E below the bass clef, octave 1 on the E above that, and so on.

1/1	0	0	<i>guitar</i>	0 (phantom, not actually occurring)	
7/4	969	970	<i>harp</i>	D	-1
91/48	1108	139	<i>guitar</i>	Eb	-1 (VI open)

Starting on E below bass clef

1/1	0	92	<i>harp</i>	E	0	
8/7	232	232	<i>harp</i>	F#	0	
6/5	316	84	<i>harp</i>	G	0	
119/96	372	56	<i>guitar</i>	Ab	0	(V open)
91/72	406	34	<i>guitar</i>	Ab	0	(VI 4th)
4/3	499	93	<i>harp</i>	A	0	
273/192	610	111	<i>guitar</i>	Bb	0	(VI 5th)
3/2	702	92	<i>harp</i>	B	0	
8/5	814	112	<i>harp</i>	C	0	
77/48	819	5	<i>guitar</i>	C#	0	(IV open)
119/72	870	51	<i>guitar</i>	Db	0	(V 4th)
7/4	969	99	<i>harp</i>	D	0	
119/64	1074	105	<i>guitar</i>	Eb	0	(V 5th)
91/48	1108	34	<i>guitar</i>	Eb	0	(VI 12th)

Starting on E in middle of bass clef

1/1	0	92	<i>harp</i>	E	1	
77/72	117	117	<i>guitar</i>	F#	1	(IV 4th)
9/8	204	87	<i>harp</i>	F#	1	
7/6	267	63	<i>harp</i>	G	1	
7/6	267	0	<i>guitar</i>	G	1	(III open)
77/64	321	54	<i>guitar</i>	G#	1	(IV 5th)
119/96	372	51	<i>guitar</i>	Ab	1	(V 12th)
91/72	406	34	<i>guitar</i>	Ab	1	(VI 4th + oct)
21/16	471	65	<i>harp</i>	A	1	
49/36	534	63	<i>guitar</i>	Bb	1	(II open)
273/192	610	76	<i>guitar</i>	Bb	1	(VI 5th + oct)
3/2	702	92	<i>harp</i>	B	1	
49/32	738	36	<i>harp</i>	C	1	
14/9	765	27	<i>guitar</i>	C	1	(III 4th)
77/48	819	54	<i>guitar</i>	C#	1	(IV 12th)
119/72	870	51	<i>guitar</i>	Db	1	(V 4th + oct)
7/4	969	99	<i>harp</i>	D	1	
7/4	969	0	<i>guitar</i>	D	1	(II 5th)
49/27	1032	63	<i>guitar</i>	Eb	1	(II 4th)

or jim, ben and lou

119/64	1074	42	<i>guitar</i>	Eb	1	(V 5th + oct)
91/48	1108	34	<i>guitar</i>	Eb	1	(VI 24th)

Starting on E above middle C

1/1	0	92	<i>harp</i>	E	2	
49/48	36	36	<i>guitar</i>	F	2	(I open)
49/48	36	0	<i>guitar</i>	F	2	(II 5th)
77/72	117	81	<i>guitar</i>	F#	2	(IV 4th + oct)
35/32	156	39	<i>harp</i>	F#	2	
7/6	267	111	<i>guitar</i>	G	2	(III 12th)
6/5	316	49	<i>harp</i>	G	2	
77/64	321	5	<i>guitar</i>	Ab	2	(IV 5th + oct)
119/96	372	51	<i>guitar</i>	Ab	2	(V 24th)
4/3	499	127	<i>harp</i>	A	2	
49/36	534	35	<i>guitar</i>	Bb	2	(I 4th)
49/36	534	0	<i>guitar</i>	Bb	2	(II 12th)
32/21	730	196	<i>harp</i>	B	2	
14/9	765	27	<i>guitar</i>	C	2	(III 4th + oct)
8/5	814	49	<i>harp</i>	C	2	
77/48	819	5	<i>guitar</i>	C#	2	(IV 24th)
7/4	969	150	<i>guitar</i>	D	2	(III 5th + oct)
49/27	1032	63	<i>guitar</i>	Eb	2	(II 4th + oct)
15/8	1089	57	<i>harp</i>	D#	2	

Starting on E on top space of treble clef

1/1	0	111	<i>harp</i>	E	3	
49/48	36	36	<i>guitar</i>	F	3	(I 12th)
49/48	36	0	<i>guitar</i>	F	3	(II 5th + oct)
9/8	204	168	<i>harp</i>	F#	3	
7/6	267	63	<i>harp</i>	G	3	
7/6	267	0	<i>guitar</i>	G	3	(III 24th)
21/16	471	204	<i>harp</i>	A	3	
49/36	534	63	<i>guitar</i>	Bb	3	(II 24th)
49/36	534	63	<i>guitar</i>	Bb	3	(I 4th + oct)
3/2	702	168	<i>harp</i>	B	3	
49/32	738	36	<i>harp</i>	C	3	
49/32	738	0	<i>guitar</i>	C	3	(I 5th + oct)
7/4	969	231	<i>harp</i>	D	3	

Starting on E above treble clef

1/1	0	231	<i>harp</i>	E	4	
49/48	36	36	<i>guitar</i>	F	4	(I 24th)
8/7	232	196	<i>harp</i>	F#	4	
6/5	316	84	<i>harp</i>	G	4	

III The World's Longest Melody (trio version) "The Ever-Widening Halfstep"

Section 1

Harp

Guitar

Percussion

Resultant

(simile)

8 III₀ III₁₂ IV₅ III₀ IV₅ III₁₂

Harp

Guit.

Perc.

Resultant

(simile)

8 IV₇ V₅ III₀ IV₇ III₀ III₁₂ V₅ I₅ III₁₂ III₅ I₁₂ IV₇ III₀

Harp

Guit.

Perc.

Resultant

8 V₀ IV₇ III₀ IV₇ III₁₂ II₀ III₀ IV₇ VI₁₇ I₇ III₁₂

Harp

Guit.

Perc.

Resultant

8 I₇ III₅ VI₁₂ III₀ IV₇ III₅ V₁₂ IV₇ III₁₂ III₅ IV₇ III₅ IV₇ II₀ V₀ VI₀

Harp

Guit. VI₀ V₀ V₀ VI₇ VI₅ VI₇ VI₅ VI₇

Perc. 4 4 2 2 4 4 4 3

Resultant

Section 2

Harp

Guit. III₇ III₇ IV₅ III₇ I₇ IV₅ III₇ III₅ V₁₇ II₅ V₇ I₇ II₀ II₀

Perc. 6 5 5 5 7 5

Resultant

Harp

Guit. II₅ III₅ I₁₂ VI₇ VI₅ VI₇ V₇ VI₁₂ III₅ IV₇ VI₅ II₅ II₁₂ III₇ I₇ II₁₂ IV₅

Perc. 5 7 5 6 5

Resultant

Harp

Guit. I₇ II₁₂ IV₇ IV₁₇ V₀ VI₇ VI₅ III₁₇ III₇

Perc. 5 9 9 7 9

Resultant

Harp

Guit. *8* VI₇ V₀ VI₇ VI₅ VI₇ V₅ V₇ III₅ II₁₂ II₁₂ III₁₇ I₇ III₇ IV₀ VI₇ V₅ IV₀

Perc. 5 7 6 8 6

Resultant

Harp

Guit. *8* VI₅ VI₇ III₅ V₁₂ II₅ V₇ V₁₇ II₅ IV₁₇ V₅ I₇ III₅ VI₇ IV₀ VI₁₂ VI₁₇ VI₇

Perc. 7 8 8 7

Resultant

Harp

Guit. *8* VI₁₇ VI₁₂ IV₀ VI₅ VI₇ VI₁₂ II₅ II₇ VI₅ V₀ VI₇ V₅ VI₁₂ V₇ III₅ V₅

Perc. 6 8 7 8 7

Resultant

Section 3

Harp

Guit. *8* VI_{0b} V₇ III₅ VI₇ VI₁₂ VI₇ III₅ III₅ IV₁₂ VI₁₂ V₀ VI₅

Perc. 9 9 10 10

Resultant

Harp

Guit. $\frac{8}{8}$ VI₇ VI₅ V₀ V₀ II₅ II₇ III₅ II₇ II₅ II₅ IV₁₂

Perc. 14 13 7

Resultant

Harp

Guit. $\frac{8}{8}$ III₅ II₀ V₁₇ III₇ VI₁₇ IV₇ VI₁₂ VI₁₇ IV₁₂ VI₀ IV₀ V₀ VI₀

Perc. 14 14

Resultant

Harp

Guit. $\frac{8}{8}$ II₀ III₅ V₇ V₅ VI₅ VI₇ V₇ VI₁₂ III₀ III₀ IV₇ II₀ III₇ II₅ II₇ IV₅

Perc. 7 10 14

Resultant

Harp

Guit. $\frac{8}{8}$ II₁₇ II₇ II₅ III₅ VI₁₇ IV₁₂ III₀ IV₇ VI₅ VI₇ III₀ VI₁₇ V₁₇ IV₁₇ V₅ IV₁₇ V₁₇

Perc. 10 8 14

Resultant

Harp

Guit.

Perc.

Resultant

8 V_0 IV_0 V_7 V_{12} II_0 III_0 VI_{12} V_0 III_7 III_5 II_5 II_5

Harp

Guit.

Perc.

Resultant

8 II_5 II_5 IV_7 II_5 II_5 V_{12} II_0 IV_5 IV_7 III_7 II_7 III_5 II_7 IV_5 IV_7 V_{17} II_5 VI_{17} III_5 V_{17} VI_{17}

13 14

Harp

Guit.

Perc.

Resultant

8 II_{17} II_{12} III_{12} V_7 IV_{12} III_0 VI_{12} II_5 IV_{12} VI_{17} VI_{12} IV_0 V_7 V_{12} V_{12} III_7 IV_5 II_7 IV_5 II_{17} V_5 I_5 III_{17}

9 9 11

Section 4

Harp

Guit.

Perc.

Resultant

8 IV_7 V_{17} VI_5 V_7 III_{12} III_7 II_0 III_7 IV_7 I_7 II_7 II_7 III_5 V_5 VI_5 VI_7 VI_{12} VI_{17} III_5

14 12

Harp

Guit. IV_7 V_5 IV_0 V_7 IV_0 V_5 IV_7 II_5 III_{12} I_{17} I_5 III_7 III_{17} IV_7 I_5

Perc. 15 11

Resultant

Harp

Guit. IV_7 VI_{12} V_5 VI_7 III_5 V_5 IV_7 II_5 II_7 II_{12} VI_5 III_7 IV_7 VI_7 II_5 III_5 II_0

Perc. 16 16

Resultant

Harp

Guit. V_7 V_{12} IV_{17} I_7 III_7 II_7 IV_0 III_5 VI_7 IV_{17} IV_{17} VI_{17} III_5 VI_7 VI_0

Perc. 13 15

Resultant

Harp

Guit. V_7 VI_5 V_0 V_5 III_0 IV_0 V_5 III_5 IV_7 IV_5 II_{17} VI_5 VI_{17} V_7 III_5 IV_5 II_0 V_7 III_{17}

Perc. 13 13 10

Resultant

Harp

Guit. IV_7 III_7 II_0 $IV_{17}b$ V_5 III_7 II_7 III_7 II_{17} IV_7 V_{17} VI_5b II_{12} II_5 IV_7 V_7 IV_7

Perc. 15 13

Resultant

Harp

Guit. III_5 VI_5b I_5 I_7 V_5 II_5 V_7 bI_5 VI_5 VI_{12} V_0 II_7 III_5 II_7

Perc. 16 9

Resultant

Harp

Guit. III_0 V_0 V_7 V_7 VI_5 III_5 V_{17} III_5 I_5 III_5 V_{12} V_5 II_0 VI_{12} V_0 VI_7

Perc. 14 12

Resultant

Harp

Guit. II_5b III_7 II_0 III_5 IV_0 VI_{17} VI_{17} V_7 II_5 I_5 IV_5 I_7

Perc. 15 11

Resultant

Harp

Guit.
 8 IV₇ II₁₇ III₅ II₇ II₇ III₅ II₁₇ V₅ IV₇ V₁₇ VI₅ II₀ V₇ VI₇

Perc.
 14 9

Resultant

Harp

Guit.
 8 VI₁₂ IV₁₂ VI₁₇ V₇ V₀ III₁₇ VI₅ V₇ VI₇ V₇ VI₅ VI₇ IV₇ I₅ IV₅ IV₁₇ V₇ VI₁₇

Perc.
 12 15

Resultant

Harp

Guit.
 8 IV₇ V₁₂ II₀ VI₁₇ V₅ III₁₂ IV₁₇ II₀ VI₇ III₅ III₀ VI₁₂ IV₀ VI₅ V₇

Perc.
 9 9 6

Resultant

Section 5

Harp

Guit.
 8 II₅ IV₅ II₅ VI₅ VI₇ III₁₂ I₅ V₅ VI₇ III₅ V₅ II₀ III₁₂ VI₅ IV₁₂ IV₇

Perc.
 8 11 16

Resultant

Harp

Guit. 8 IV_{12} V_{12} IV_{12} II_5 IV_7 VI_7 IV_7 VI_{12} VI_7 III_0 VI_{12} III_5 V_7

Perc. 8 13

Resultant

Harp

Guit. 8 III_{12} III_5 I_5 IV_{12} VI_{17} IV_{17} IV_5 I_5 II_{17} VI_7 V_{12} IV_7 I_7 V_7 III_5 V_7 VI_{17}

Perc. 11 9 13

Resultant

Harp

Guit. 8 II_5 III_{17} V_5 IV_7 II_0 V_5 III_0 VI_5 III_{12} VI_7 V_5 II_0 II_5 II_{17} III_5 IV_7 II_{17} VI_{17} III_{12} VI_7 IV_7

Perc. 14 13 10

Resultant

Harp

Guit. 8 III_5 I_7 II_5 II_5 III_7 II_0 II_{17} I_5 II_7 V_5 I_5 III_5 II_7 III_7 II_0 II_7 III_5

Perc. 13 10 10

Resultant

Harp

Guit. $\text{IV}_7 \text{IV}_{12} \text{II}_5 \text{III}_{17} \text{II}_{17} \text{II}_{12} \text{VI}_{17} \text{VI}_{12} \text{III}_5 \text{V}_7 \text{V}_0 \text{VI}_7 \text{IV}_7 \text{II}_7 \text{III}_{17} \text{IV}_7 \text{VI}_5 \text{III}_7 \text{I}_7 \text{I}_5$

Perc. 13 8 11

Resultant

Harp

Guit. $\text{II}_{17} \text{II}_0 \text{III}_{12} \text{IV}_{17} \text{IV}_7 \text{I}_7 \text{III}_{17} \text{IV}_7 \text{III}_5 \text{IV}_7 \text{VI}_5 \text{V}_7 \text{VI}_7 \text{IV}_5 \text{II}_{12} \text{II}_{17}$

Perc. 15 12

Resultant

Harp

Guit. $\text{VI}_{17} \text{IV}_0 \text{VI}_7 \text{VI}_{12} \text{VI}_{17} \text{III}_0 \text{V}_5 \text{VI}_{12} \text{VI}_{17} \text{III}_5 \text{IV}_5 \text{II}_{12} \text{II}_0 \text{IV}_7 \text{I}_5 \text{IV}_5 \text{III}_5 \text{IV}_5 \text{V}_7$

Perc. 8 12 15

Resultant

Harp

Guit. $\text{III}_5 \text{IV}_7 \text{V}_5 \text{III}_5 \text{I}_7 \text{III}_5 \text{II}_{17} \text{IV}_{12} \text{V}_{12} \text{IV}_{12} \text{III}_0$

Perc. 11 15

Resultant

Harp

Guit.
 8 III₁₂ IV₇ V₇ V₁₂ V₀ III₅ V₅ V₁₂ IV₇ III₅ III₇ II₀ III₇ II₀ III₅ VI₁₂ V₇

Perc.
 16 9 8

Resultant

Harp

Guit.
 8 V₇ II₁₇ III₇ IV₅ II₁₇ II₅ II₇ II₇ III₁₂ V₁₂ IV₁₇ VI₅ III₀ VI₇

Perc.
 16 8

Resultant

Harp

Guit.
 8 IV₇ V₇ VI₁₇ V₅ V₁₂ IV₁₂ V₅ V₅ IV₁₂ III₁₇ II₀ VI₇ III₇ I₅ II₀ II₀

Perc.
 11 16

Resultant

Harp

Guit.
 8 III₀ VI₁₂ VI₁₇ VI₇ II₀ VI₇ III₅ II₀ III₇ V₇ VI₇ II₀ III₇ I₅ V₅ II₀ V₅ VI₁₇

Perc.
 16 13

Resultant