CODEX PÆRNVENSIS

LIBER EXERCITIORUM AD MVSICAM MICROTONALEM

VOL. I

COMPOSUIT HANS-GUNTER LOCK

A.D. MMXXI

SOCIETAS ARNOLD SCHOENBERG ESTONICA

22-EDO Scales for Sevish's Scale Workshop Synthesizer

22-EDO chromatic

https://sevish.com/scaleworkshop/?name=22%20equal%20divisions%20of%202%2F1&data=54.54545454545455%0A109.0909090909091%0A163.63636363636363%0A218.1818181818182%0A272.72727272727275%0A327.27272727272725%0A381.8181818181818%0A436.3636363636364%0A490.90909090909093%0A545.4545454545455%0A600.%0A654.5454545454545%0A709.0909090909091%0A763.6363636363636%0A818.1818181818182%0A872.7272727272727%0A927.2727272727273%0A981.8181818181819%0A1036.3636363636365%0A1090.909090909091%0A1145.4545454545455%0A1200.&freq=261.625565&midi=60&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=triangle&ampenv=organ

D-Superpyth[7] 4414441 (major)

https://sevish.com/scaleworkshop/?name=Superpyth%5B7%5D%20major%20mode&data=218.1818181818182%0A436.3636363636364%0A490.90909090909093%0A709.0909090909091%0A927.2727272727273%0A1145.4545454545455%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=triangle&ampenv=organ

D-Superpyth[7] 4144414 (dorian)

https://sevish.com/scaleworkshop/?name=Superpyth%5B7%5D%20dorian%20mode&data=218.1818181818182%0A272.72727272727275%0A490.90909090909093%0A709.0909090909091%0A927.2727272727273%0A981.8181818181819%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=square&ampenv=organ

D-Superpyth[7] 4144414 (phrygian)

https://sevish.com/scaleworkshop/?name=Superpyth%5B7%5D%20phrygian%20mode&data=54.54545454545455%0A272.72727272727275%0A490.90909090909093%0A709.0909090909091%0A763.6363636363636%0A981.8181818181819%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=square&ampenv=organ

D-Pajara[10] 22322 22322

https://sevish.com/scaleworkshop/?name=D-Pajara%5B10%5D%2022322%2022322&data=109.0909090909091%0A218.1818181818182%0A381.8181818181818%0A490.90909090909093%0A600.%0A709.0909090909091%0A818.1818181818182%0A981.8181818181819%0A1090.909090909091%0A1200.%0A&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=triangle&ampenv=organ

D-Porcupine[7] 3433333

https://sevish.com/scaleworkshop/?name=Porcupine%5B7%5D%203433333&data=163.63636363636363%0A381.8181818181818%0A545.4545454545455%0A709.0909090909091%0A872.7272727272727%0A1036.3636363636365%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=triangle&ampenv=organ

D-Porcupine[7] 3343333

https://sevish.com/scaleworkshop/?name=Porcupine%5B7%5D%203343333&data=163.63636363636363%0A327.27272727272725%0A545.4545454545455%0A709.0909090909091%0A872.7272727272727%0A1036.3636363636365%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=sawtooth&ampenv=organ

D-Porcupine[7] 3334333

https://sevish.com/scaleworkshop/?name=Porcupine%5B7%5D%203334333&data=163.63636363636363%0A327.27272727272725%0A490.90909090909093%0A709.0909090909091%0A872.7272727272727%0A1036.3636363636365%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=sawtooth&ampenv=organ

Porcupine[8] 33133333

https://sevish.com/scaleworkshop/?name=Porcupine%5B8%5D%203433333&data=163.63636363636363%0A327.27272727272725%0A381.8181818181818%0A545.4545454545455%0A709.0909090909091%0A872.7272727272727%0A1036.3636363636365%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=square&ampenv=organ

Machine[6] 424444

https://sevish.com/scaleworkshop/?name=Machine%5B6%5D%20424444&data=218.1818181818182%0A327.27272727272725%0A545.4545454545455%0A763.6363636363636%0A981.8181818181819%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=square&ampenv=organ

Machine[6] 244444

https://sevish.com/scaleworkshop/?name=Machine%5B6%5D%20244444&data=109.0909090909091%0A327.27272727272725%0A545.4545454545455%0A763.6363636363636%0A981.8181818181819%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=square&ampenv=organ

Machine[6] 444442

https://sevish.com/scaleworkshop/?name=Machine%5B6%5D%20444442&data=218.1818181818182%0A436.3636363636364%0A654.5454545454545%0A872.7272727272727%0A1090.909090909091%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=square&ampenv=organ

Machine[6] 444424

https://sevish.com/scaleworkshop/?name=Machine%5B6%5D%20444424&data=218.1818181818182%0A436.3636363636364%0A654.5454545454545%0A872.7272727272727%0A981.8181818181819%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=square&ampenv=organ

Machine[6] 444244

https://sevish.com/scaleworkshop/?name=Machine%5B6%5D%20444244&data=218.1818181818182%0A436.3636363636364%0A654.5454545454545%0A763.6363636363636%0A981.8181818181819%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=square&ampenv=organ

Machine[6] 442444

https://sevish.com/scaleworkshop/?name=Machine%5B6%5D%20442444&data=218.1818181818182%0A436.3636363636364%0A545.4545454545455%0A763.6363636363636%0A981.8181818181819%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=square&ampenv=organ

D-Orwell[9] 23223 2323

https://sevish.com/scaleworkshop/?name=D-Orwell%5B9%5D%2023223%202323&data=109.0909090909091%0A272.72727272727275%0A381.8181818181818%0A490.90909090909093%0A654.5454545454545%0A763.6363636363636%0A927.2727272727273%0A1036.3636363636365%0A1200.&freq=293.664768&midi=62&vert=5&horiz=1&colors=white%20black%20white%20white%20black%20white%20black%20white%20white%20black%20white%20black&waveform=triangle&ampenv=organ

by Juhani Nuorvala

HOW TO USE LEIMMA FOR SCALES IN 22EDO

You need to have a Scala file for 22EDO on your computer. You can download one from the Gradus Google drive (22EDO.scl). You only need to use this once.

1. Open Leimma in Chrome. https://isartum.net/leimma

2. Sign in (or log in), using your email address and password. Google account won't work properly. Leimma does work without signing in but you can only save your tunings and scales if you have signed in.

3. Click 'Create a new tuning system'.

4. Choose the Reference Pitch. We've been using D4 (293.665 Hz) for our

solfège. 5. Click 'Next'.

6. Click 'Import Scala File' in the upper right corner. Choose the scala file for 22edo from your computer. (You only need to do this once, it will be saved with your tuning.)

7. Click 'Next'.

8. The circle has all the notes of 22edo, with cent values. If you click the empty, outer parts of each sector, you will hear the tones. D is 0 cents (if you chose that as the reference pitch). The sound is either a beep or a plucked string sound. You can select these from the MIDI Output menu on the right: 'Internal Synth (poly)' or 'Internal Strings (poly). External synths can also be used but this guide is for the internal sounds.

9. Here's how to create a subset (scale), and to map its notes on the computer keyboard or MIDI keyboard.

First choose your preferred playing method. If you have a MIDI keyboard hooked up, select it as the MIDI Input from the menu on the right. The computer keyboard,'QWERTY' is the default input.

With the mouse, choose the note marked '0' by clicking on the lower part of the sector, where the cent value is. It turns red.
Click the 'Keyboards' box in the bottom. That shows how the piano layout is mapped on the computer keys.
Choose a note from the 'Map to Keyboard' menu in the middle of the circle. It's up to you if you want to put the first note on the C key, or on the D key (because D is our tonic). The maximum number of notes in a subset is 12, and you can map them any way you want on the twelve keys. Obviously, this is the mapping for the MIDI keyboard, too, if you have one.
When you have chosen your mapping, the note turns grey. Choose the next note you want in your scale. In Porcupine[7] in the symmetrical ('Dingoian') mode 3334333, it would be the one three steps higher, ie. 164 cents. Map that to your preferred key. You can deselect notes and remap them.

10. When you have completed your scale, save it. Click 'Save to My Tunings' on the right. Save Tuning System to My Tunings:
Type '22edo' in the Name box. Save as New.
Save Scale/Mode to My Tunings
This saves the subset you created from 22edo. Type, for example, "Porcupine[7] Dingoian" in

the Name box, and "3334333" in the description.

A menu for 'Existing subsets' is created.

The next time you use Leimma, log in and click 'Select a tuning system'. Choose 22EDO from 'My Tunings' and the scale from the 'Existing subset' menu.

LEIMMA synthesizer links

Porcupine[7]+2 333312313 (3333334)

https://isartum.net/leimma/220/refpitch/D4-62/tuningsystem/1r1_1r1s1r1_54.54545s1r1_109.09091s1r1_163.63636s1r1_218.18182s1r1_272.72727s1r1_327.27273s1r1_381.81818s1r1_436.36364s1r1_490.90909s1r1_545.45455s1r1_600s1r1_654.54545s1r1_709.09091s1r1_763.63636s1r1_818.18182s1r1_872.72727s1r1_927.27273s1r1_981.81818s1r1_1036.36364s1r1_1090.90909s1r1_1145.45455/scale/403/english/0~0~3~ts3~0~6~1s6~0~7~1s9~0~10~1s12~0~12~1s13~0~13~1s15~0~15~1s18~0~0~1s19~0~1~1

Orwell[9] 323232322

https://isartum.net/leimma/220/refpitch/D3-50/tuningsystem/1r1_1r1s1r1_54.54545s1r1_109.09091s1r1_163.63636s1r1_218.18182s1r1_272.72727s1r1_327.27273s1r1_381.81818s1r1_436.36364s1r1_490.90909s1r1_545.45455s1r1_600s1r1_654.54545s1r1_709.09091s1r1_763.63636s1r1_818.18182s1r1_872.72727s1r1_927.27273s1r1_981.81818s1r1_1036.36364s1r1_1090.90909s1r1_1145.45455/scale/572/english/0~0~3~ts3~0~6~1s5~0~7~1s8~0~10~1s10~0~11~1s13~0~13~1s15~0~15~1s18~0~0~1s20~0~2~1

Orwell[9] 223232323

https://isartum.net/leimma/220/refpitch/D3-50/tuningsystem/1r1_1r1s1r1_54.54545s1r1_109.09091s1r1_163.63636s1r1_218.18182s1r1_272.72727s1r1_327.27273s1r1_381.81818s1r1_436.36364s1r1_490.90909s1r1_545.45455s1r1_600s1r1_654.54545s1r1_70

9.09091s1r1_763.63636s1r1_818.18182s1r1_872.72727s1r1_927.27273s1r1_981.81818s1r1_1036.36364s1r1_1090.90909s1r1_1145.45455/scale/584/english/0~0~3~ts2~0~5~1s4~0~6~1s7~0~8~1s9~0~10~1s12~0~13~1s14~0~15~1s17~0~16~1s19~0~0~1

Machine[6] 444244

https://isartum.net/leimma/220/refpitch/D4-62/tuningsystem/1r1_1r1s1r1_54.54545s1r1_109.09091s1r1_163.63636s1r1_218.18182s1r1_272.72727s1r1_327.27273s1r1_381.81818s1r1_436.36364s1r1_490.90909s1r1_545.45455s1r1_600s1r1_654.54545s1r1_709.09091s1r1_763.63636s1r1_818.18182s1r1_872.72727s1r1_927.27273s1r1_981.81818s1r1_1036.36364s1r1_1090.90909s1r1_1145.45455/scale/626/english/0~0~3~ts4~0~6~1s8~0~8~1s12~0~11~1s14~0~15~1s18~0~0~1

Orgone[7]+4 31231213213 (4242424)

https://isartum.net/leimma/new/refpitch/D4-62/tuningsystem/1r1_1r1s1r1_54.545454545455s1r1_109.0909090909091s1r1_163.63636363636363s1r1_218.1818181818182s1r1_272.72727272727275s1r1_327.27272727272725s1r1_381.8181818181818s1r1_436.3636363636364s1r1_490.90909090909093s1r1_545.4545454545455s1r1_600s1r1_654.5454545454545s1r1_709.0909090909091s1r1_763.6363636363636s1r1_818.1818181818182s1r1_872.72727272727272727s1r1_927.2727272727273s1r1_981.8181818181819s1r1_1036.3636363636365s1r1_1090.909090909091s1r1_1145.4545454545455/scale/new/english/0~0~3~ts3~0~5~1s4~0~6~1s6~0~7~1s9~0~9~1s10~0~10~1s12~0~13~1s13~0~15~1s16~0~16~1s18~0~0~1s19~0~1~1

Porcupine[7] 3343333

https://isartum.net/leimma/220/refpitch/D4-62/tuningsystem/1r1_1r1s1r1_54.54545s1r1_109.09091s1r1_163.63636s1r1_218.18

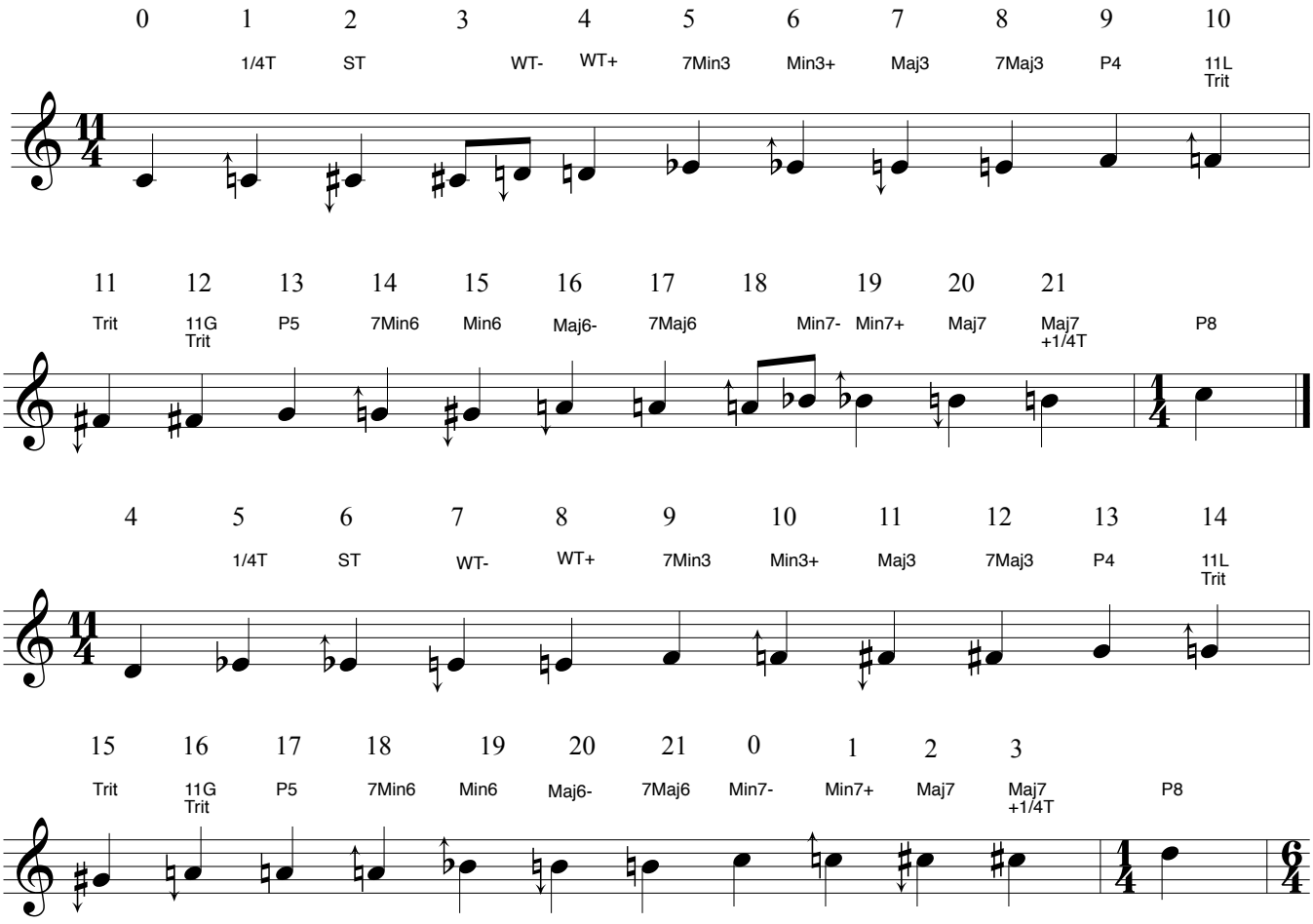
182s1r1_272.72727s1r1_327.27273s1r1_381.81818s1r1_436.36364s1r1_490.90909s1r1_545.45455s1r1_600s1r1_654.54545s1r1_709.09091s1r1_763.63636s1r1_818.18182s1r1_872.72727s1r1_927.27273s1r1_981.81818s1r1_1036.36364s1r1_1090.90909s1r1_1145.45455/scale/369/english/0~0~3~ts3~0~6~1s6~0~7~1s9~0~10~1s13~0~13~1s16~0~16~1s19~0~0~1

22-EDO Interval Name Table

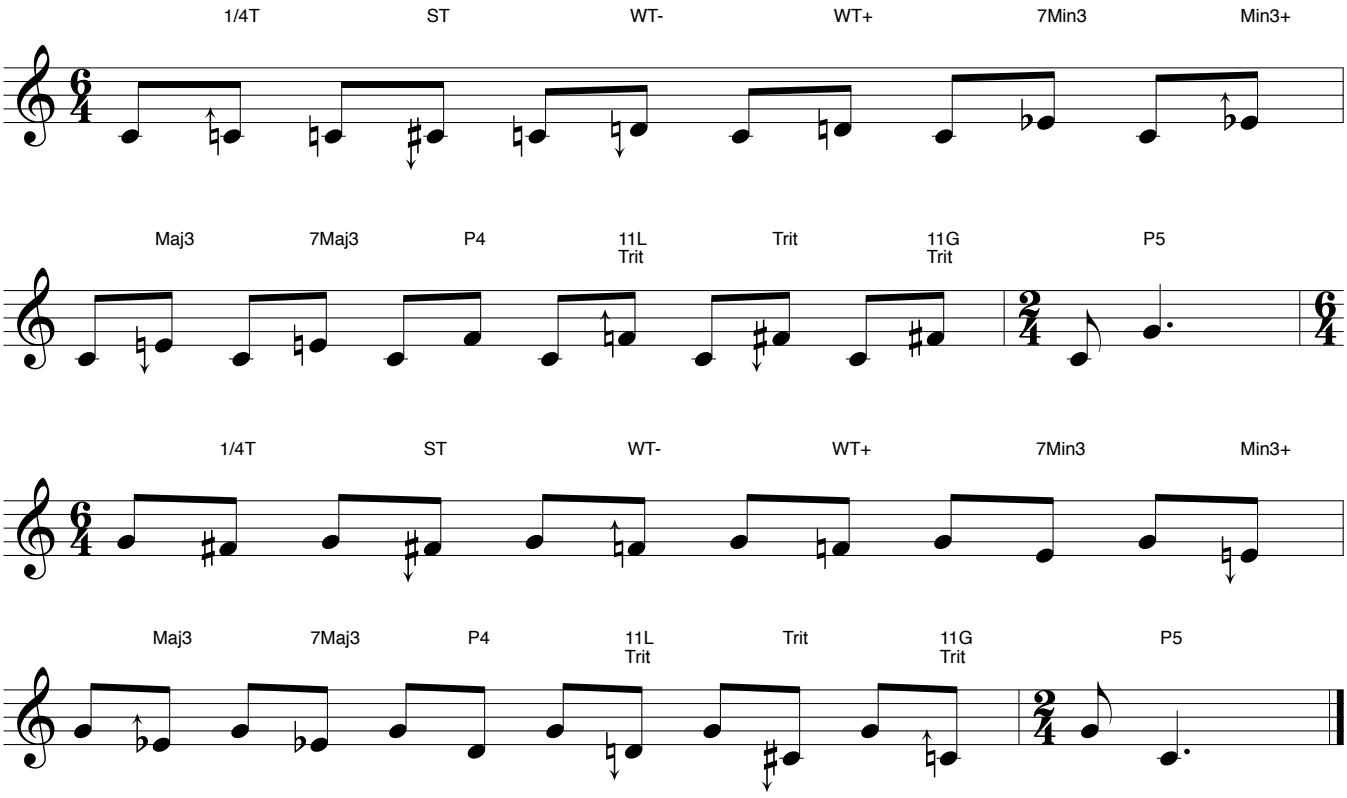
nr.	interval name	abbreviation	note name from d	intervalli nime
0	unison	unis.	d	unison
1	quarter tone	1/4T	d+	veerandtoon
2	semitone	ST	d#	pooltoon
3	lesser wholetone	WT-	e-	väiksem täistoon
4	greater wholetone	WT+	e	suurem täistoon
5	septimal minor third	7Min3	e+	seitsmene väike terts
6	greater minor third	Min3+	f	suurem väike terts
7	major third	Maj3	f#	suur terts
8	septimal major third	7Maj3	f#+	seitsmene suur terts
9	pure fourth	P4	g	kvart
10	lesser undecimal tritone	11L_Trit	g+	väiksem üheteistkümnene tritoon
11	(12-EDO) tritone	Trit	g#	(12-EDO) tritoon
12	greater undecimal tritone	11G_Trit	a-	suurem üheteistkümnene tritoon
13	slightly wider pure fifth	P5	a	veidike laiem kvint
14	septimal minor sixth	7Min6	a+	seitsmene väike sekst
15	minor sixth	Min6	a#	väike sekst
16	lesser major sixth	Maj6-	b-	väiksem suur sekst
17	septimal major sixth	7Maj6	b	seitsmene väike septim
18	lesser minor seventh	Min7-	b+	väiksem väike septim
19	greater minor seventh	Min7+	c	suurem väike septim
20	major seventh	Maj7	c#	suur septim
21	major seventh plus quarter tone	Maj7+1/4T	c#+	suur septim pluss veerandtoon
22	pure octave	P8	d	oktav

22-EDO Solfège

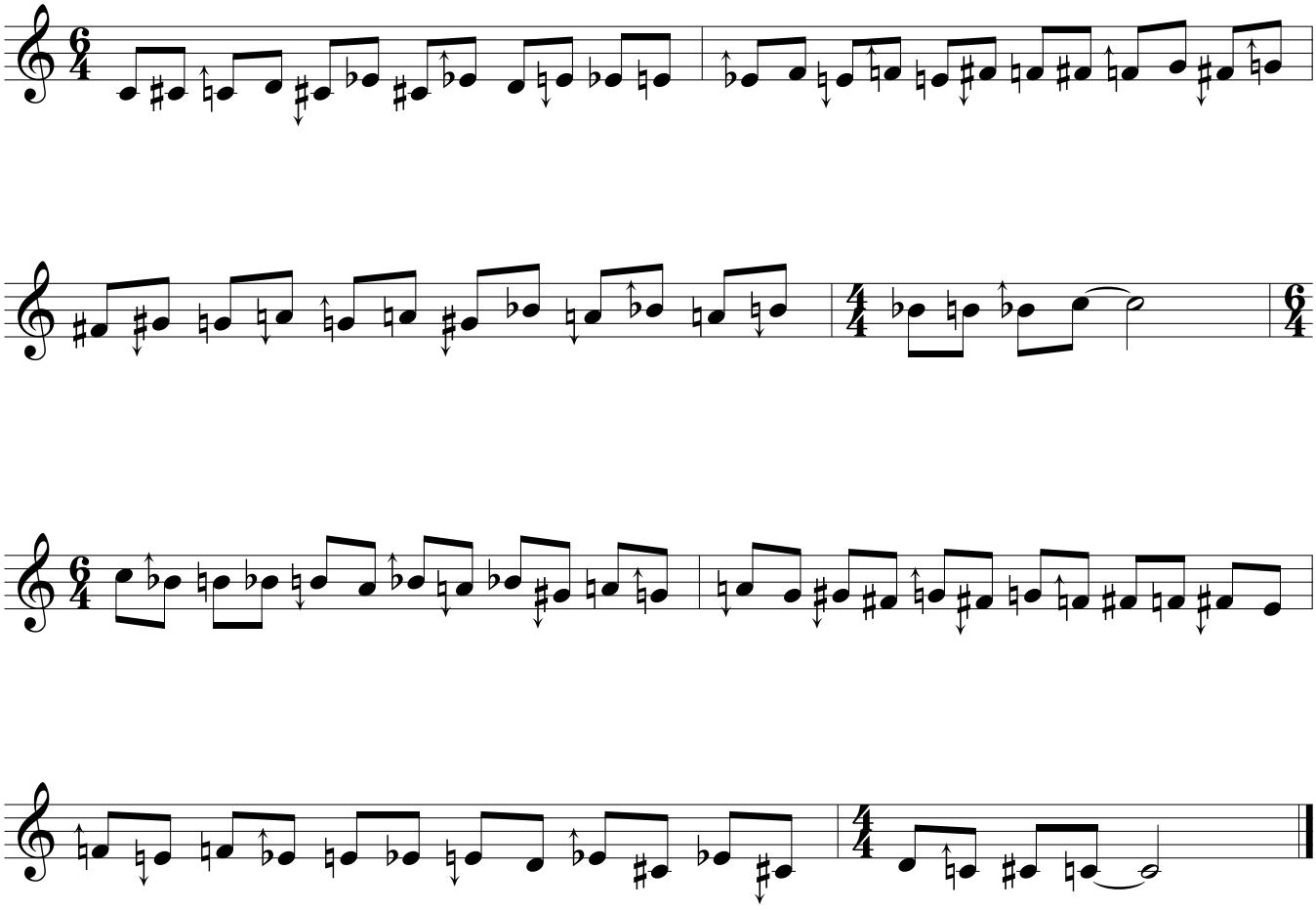
Hans-Gunter Lock



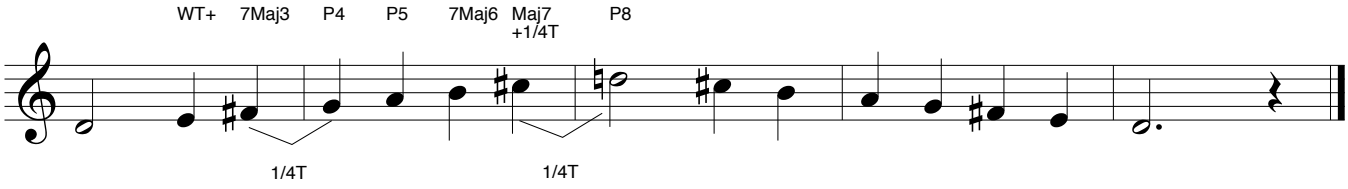
0. Chromatic Zigzag 1-12-23-3...



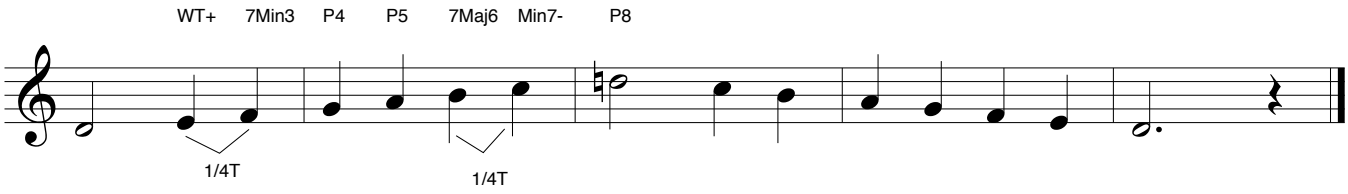
WT- up, ST down, WT- up, ST down...



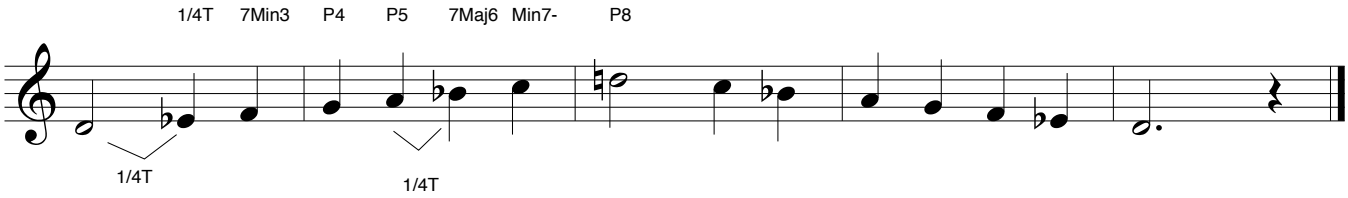
1.1 Superpyth[7] 4414441 (major) 1 = 1/4T, 4 = WT+



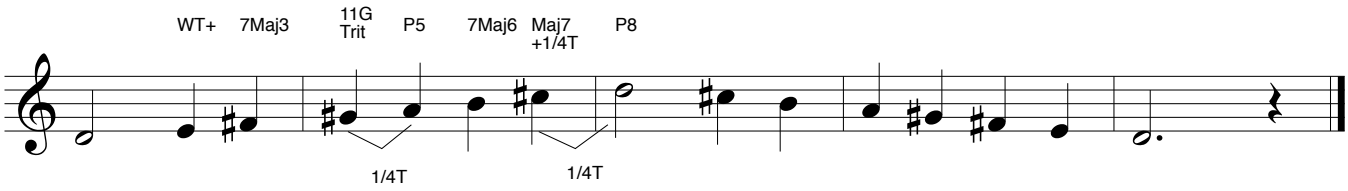
1.2 Superpyth[7] 4144414 (dorian) 1 = 1/4T, 4 = WT+



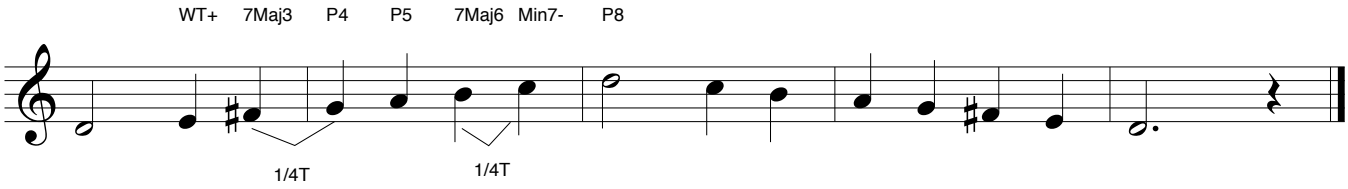
1.3 Superpyth[7] 1444144 (phrygian) 1 = 1/4T, 4 = WT+



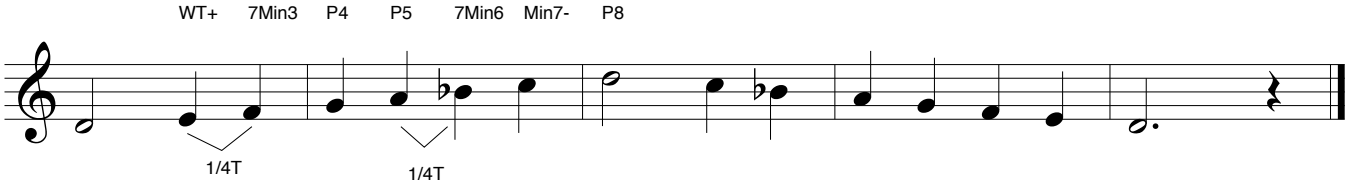
1.4 Superpyth[7] 4441441 (lydian) 1 = 1/4T, 4 = WT+



1.5 Superpyth[7] 4414414 (mixolydian) 1 = 1/4T, 4 = WT+

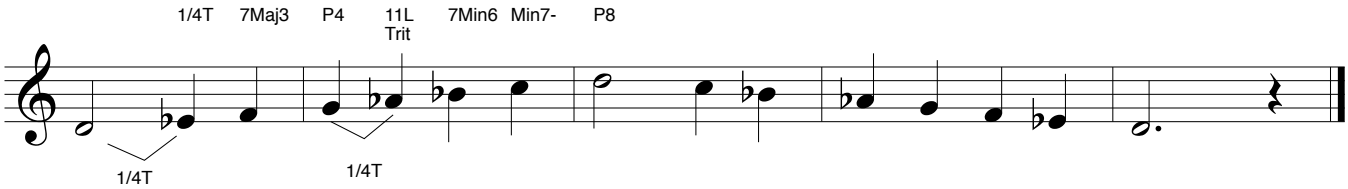


1.6 Superpyth[7] 4144144 (aeolian) 1 = 1/4T, 4 = WT+

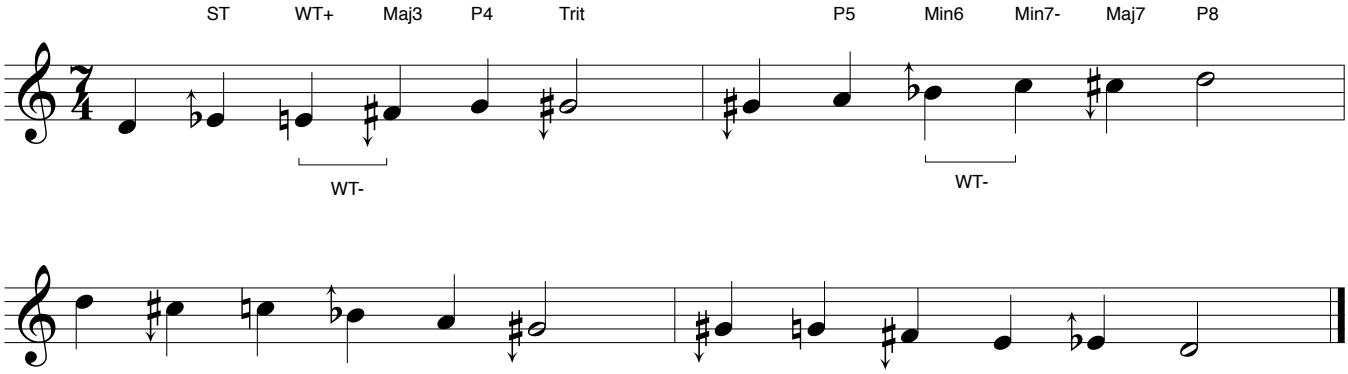


1.7 Superpyth[7] 1441444 (locrian)

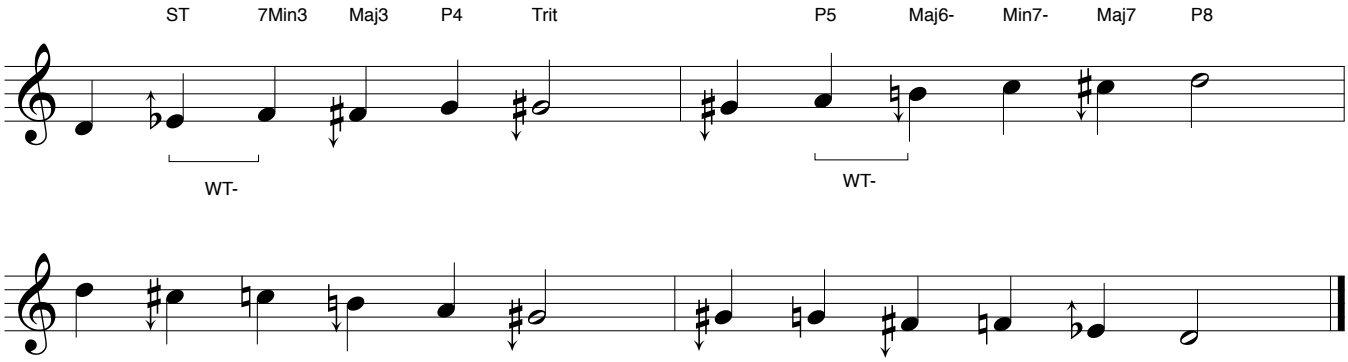
1 = 1/4T, 4 = WT+



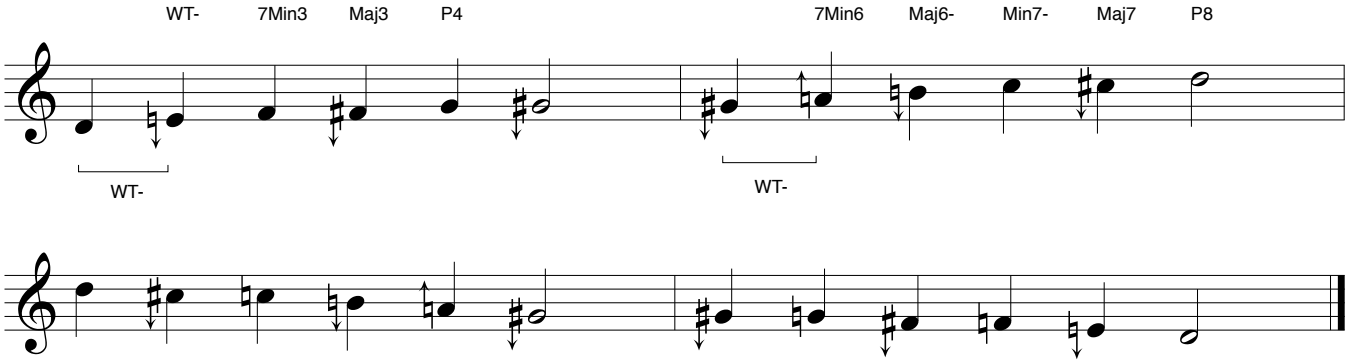
2.1 Pajara[10] 22322 22322 2 = ST, 3 = WT-



2.2 Pajara[10] 23222 23222

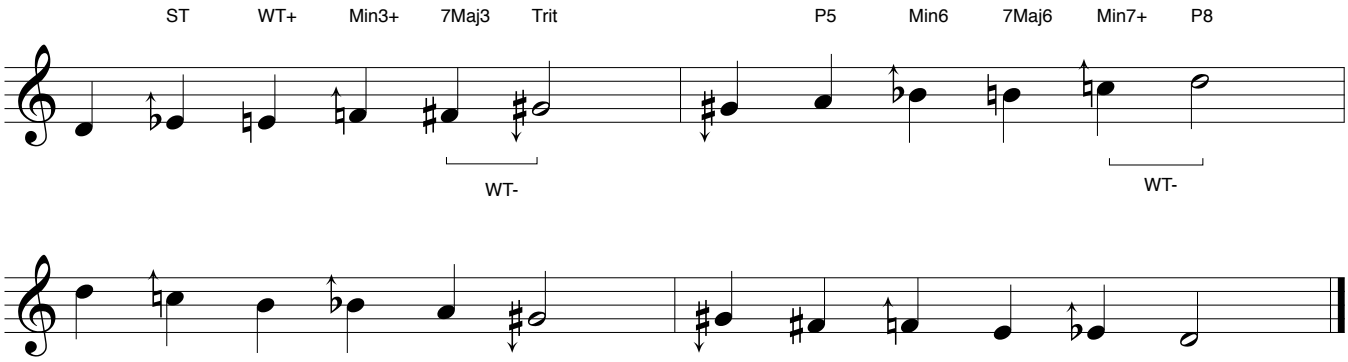


2.3 Pajara[10] 32222 32222



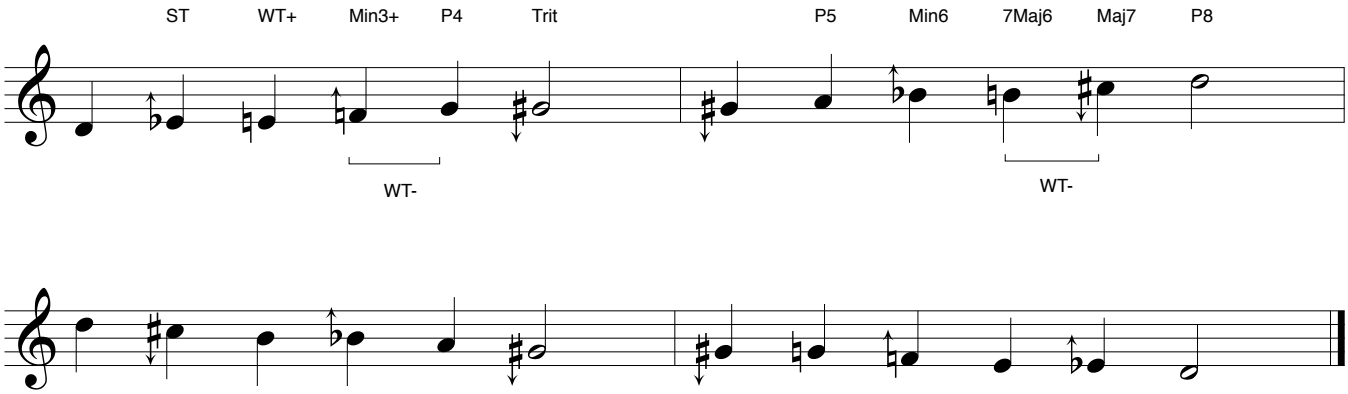
2.4 Pajara[10] 22223 22223

2 = ST, 3 = WT-



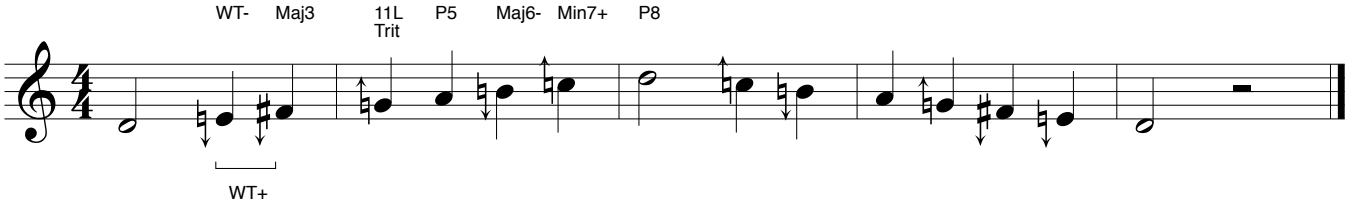
2.5 Pajara[10] 22232 22232

2 = ST, 3 = WT-



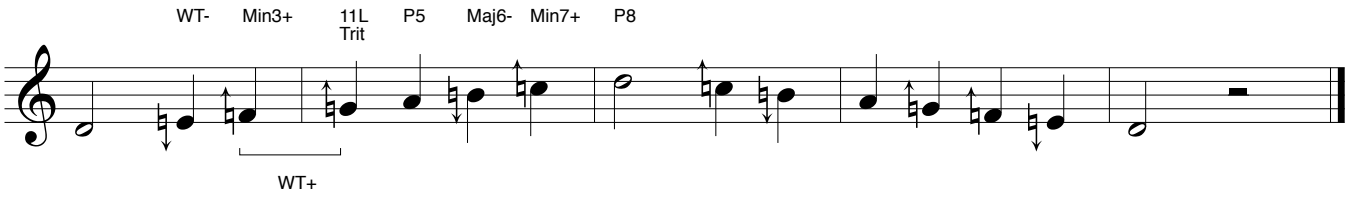
3a.1 Porcupine[7] 3433333

3 = WT-, 4 = WT+

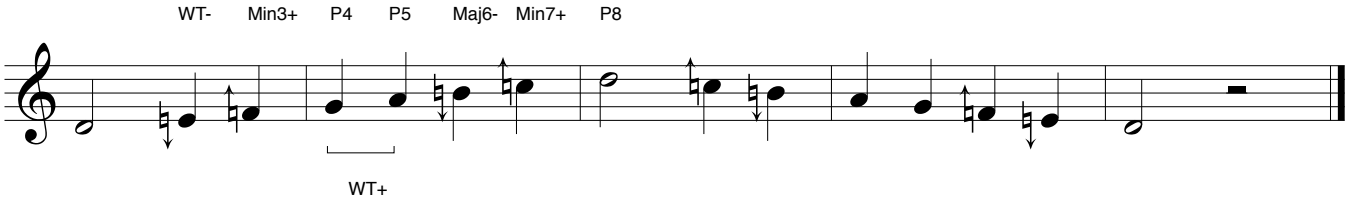


3a.2 Porcupine[7] 3343333

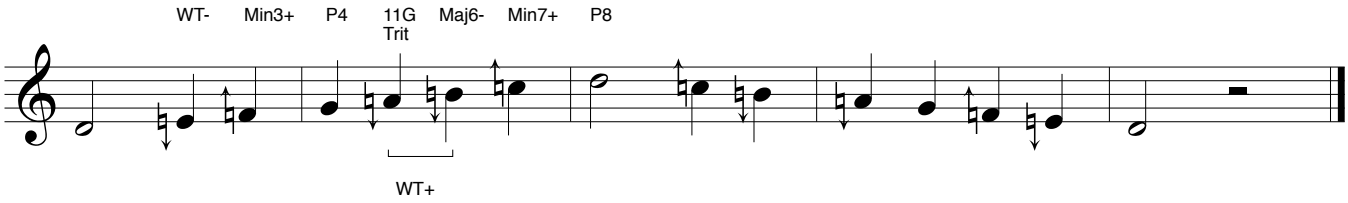
3 = WT-, 4 = WT+



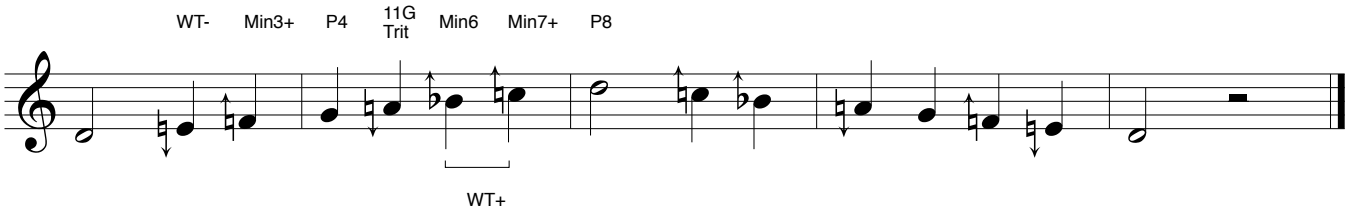
3a.3 Porcupine[7] 3334333 3 = WT-, 4 = WT+



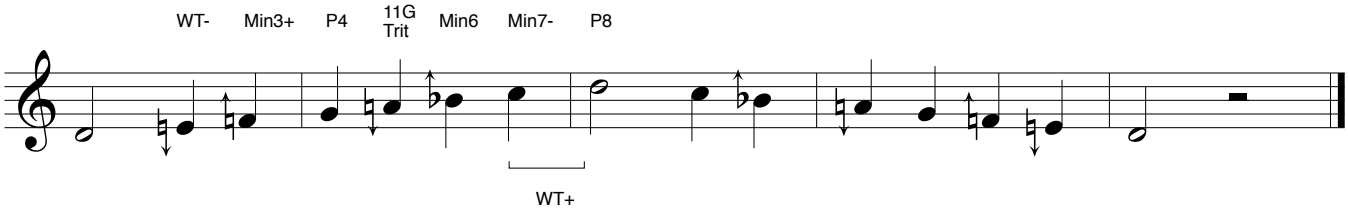
3a.4 Porcupine[7] 3333433 3 = WT-, 4 = WT+



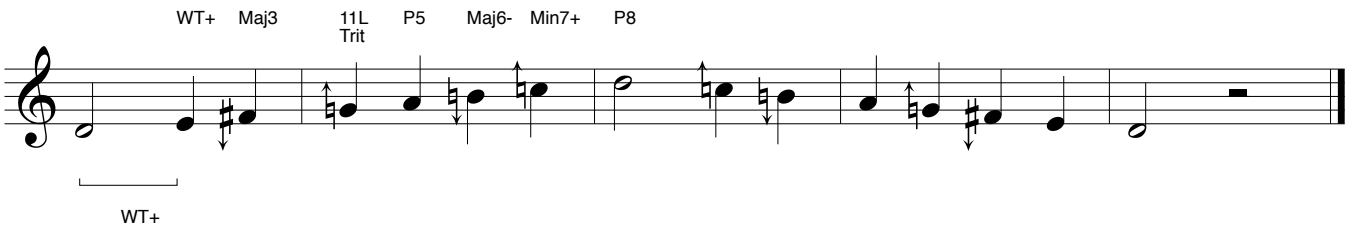
3a.5 Porcupine[7] 3333343 3 = WT-, 4 = WT+



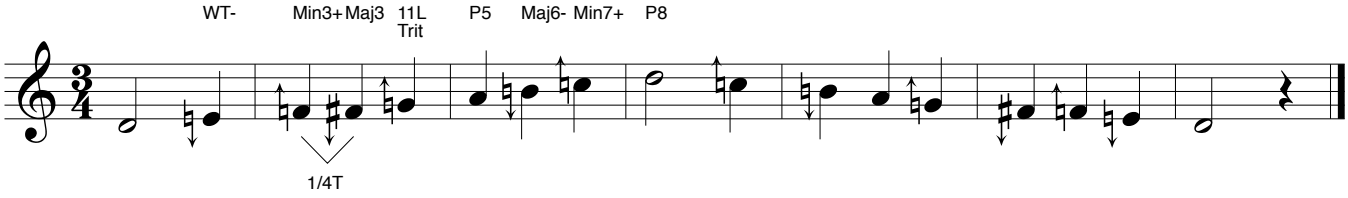
3a.6 Porcupine[7] 3333334 3 = WT-, 4 = WT+



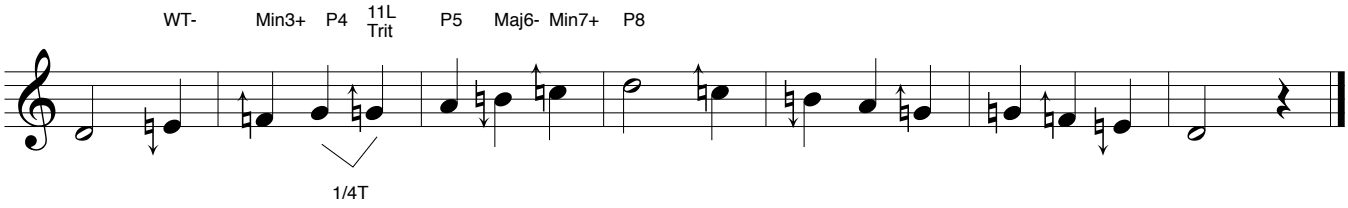
3a.7 Porcupine[7] 4333333 3 = WT-, 4 = WT+



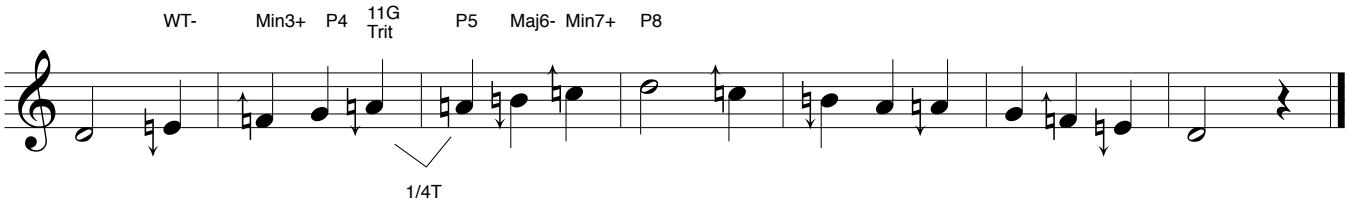
3b.1 Porcupine[8] 33133333 1 = 1/4T, 3 = WT-



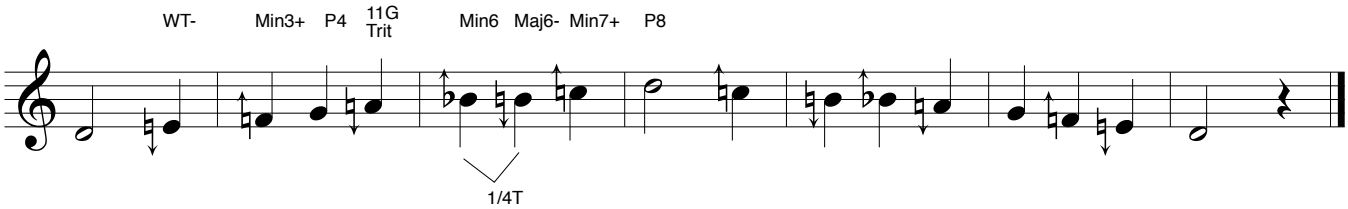
3b.2 Porcupine[8] 33313333 1 = 1/4T, 3 = WT-



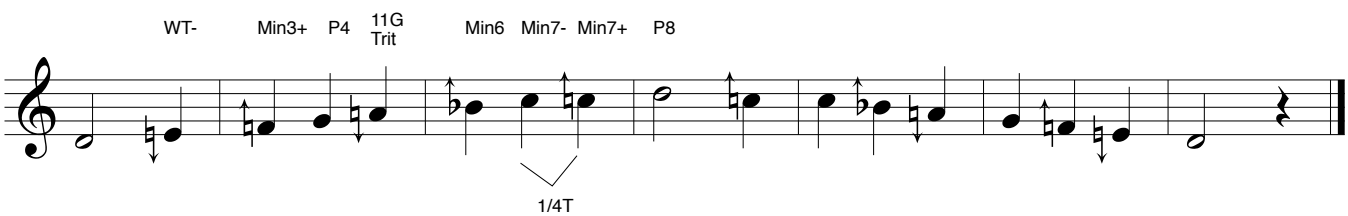
3b.3 Porcupine[8] 33331333 1 = 1/4T, 3 = WT-



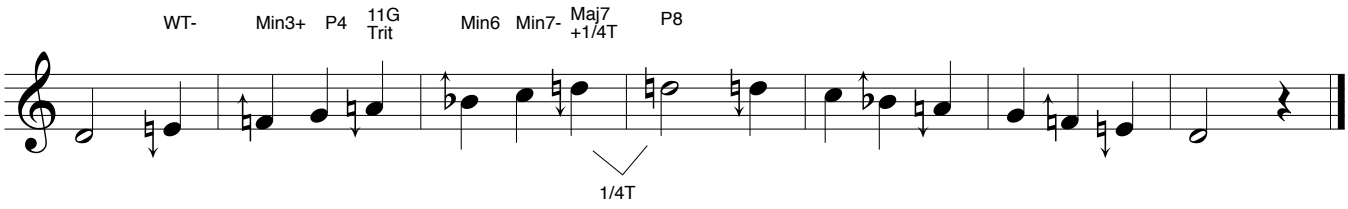
3b.4 Porcupine[8] 33333133 1 = 1/4T, 3 = WT-



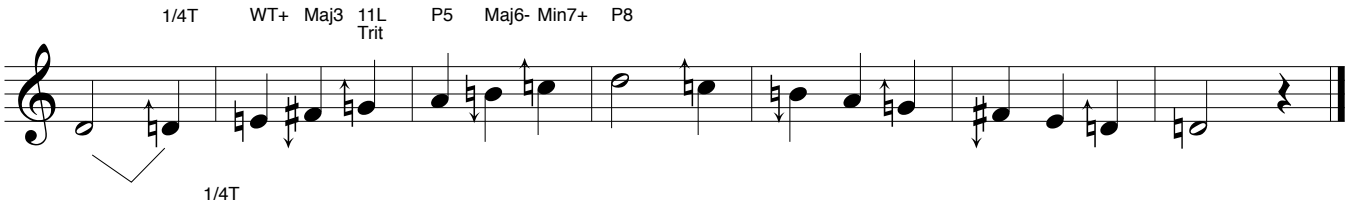
3b.5 Porcupine[8] 33333313 1 = 1/4T, 3 = WT-



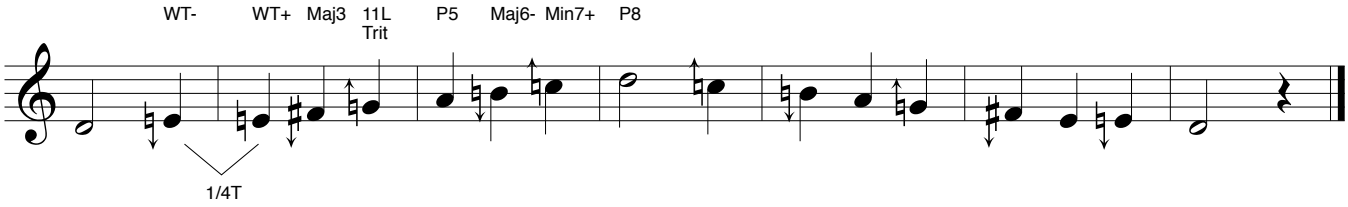
3b.5 Porcupine[8] 33333313 1 = 1/4T, 3 = WT-



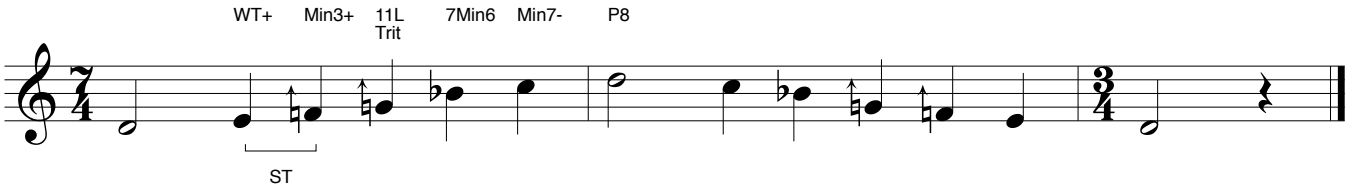
3b.7 Porcupine[8] 13333333 1 = 1/4T, 3 = WT-



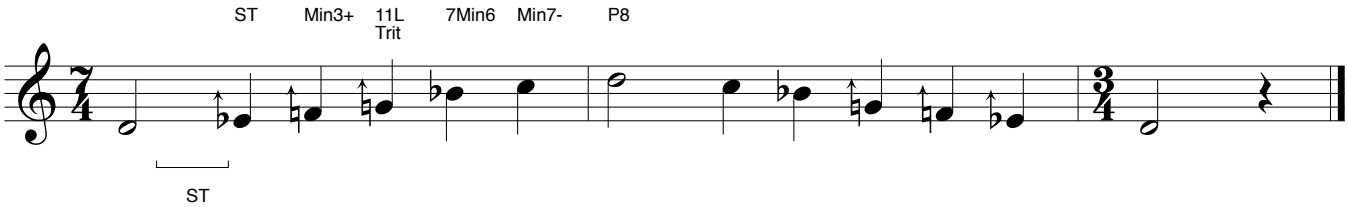
3b.8 Porcupine[8] 31333333 1 = 1/4T, 3 = WT-



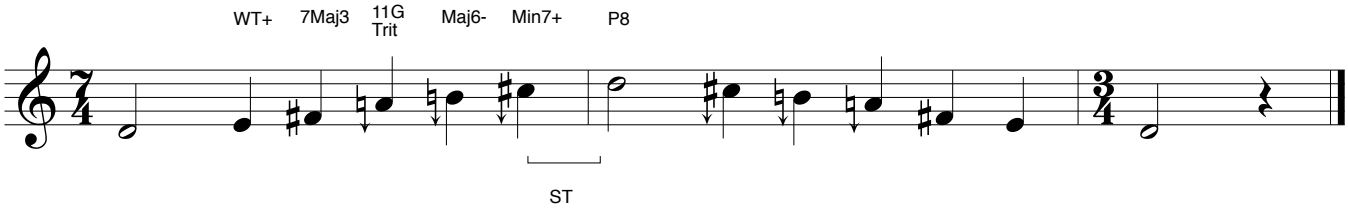
4.1 Machine[6] 424444 2 = ST, 4 = WT+



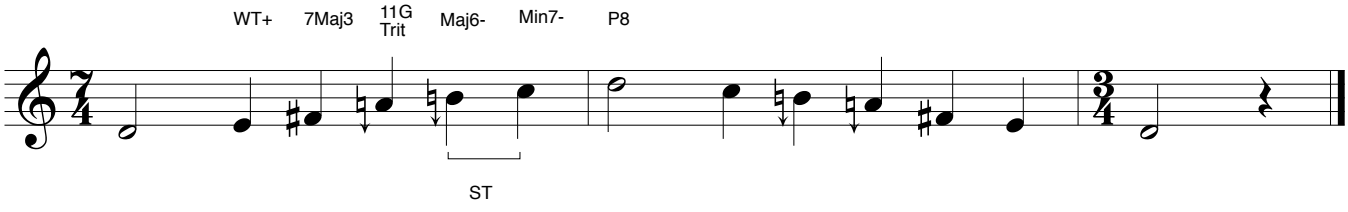
4.2 Machine[6] 244444 2 = ST, 4 = WT+



4.3 Machine[6] 444442 2 = ST, 4 = WT+

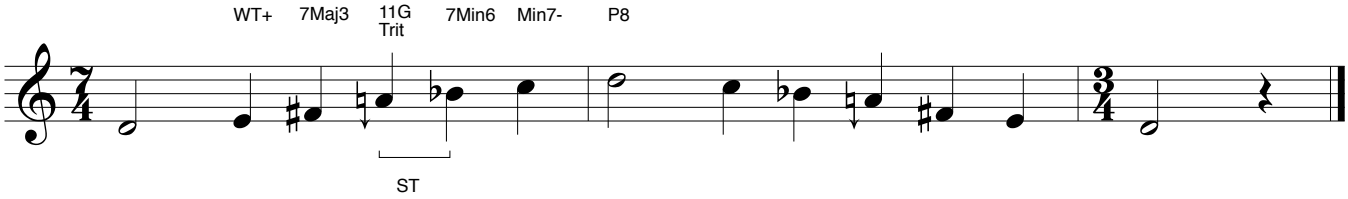


4.4 Machine[6] 444424 2 = ST, 4 = WT+



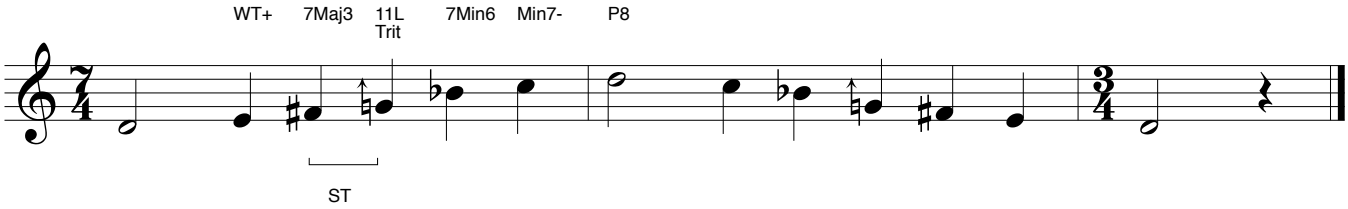
4.5 Machine[6] 444244

2 = ST, 4 = WT+



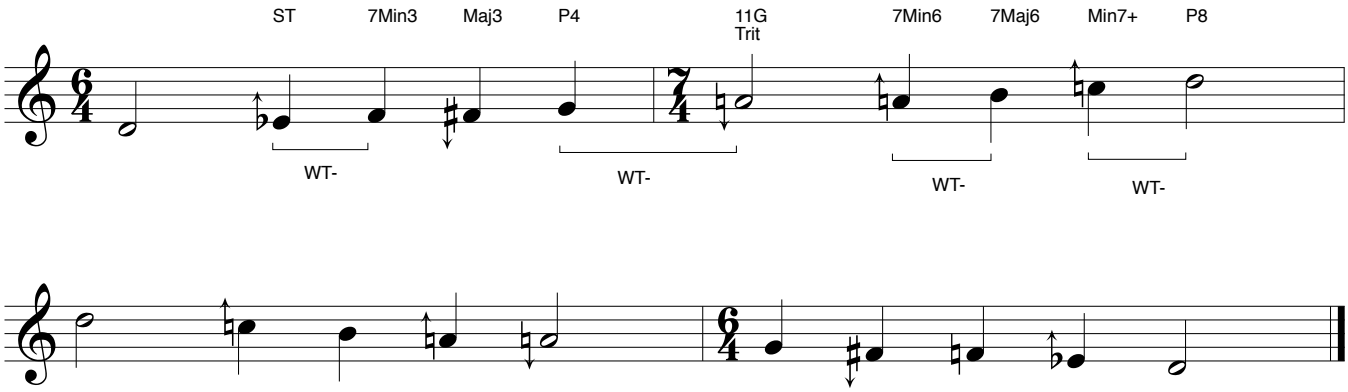
4.6 Machine[6] 442444

2 = ST, 4 = WT+



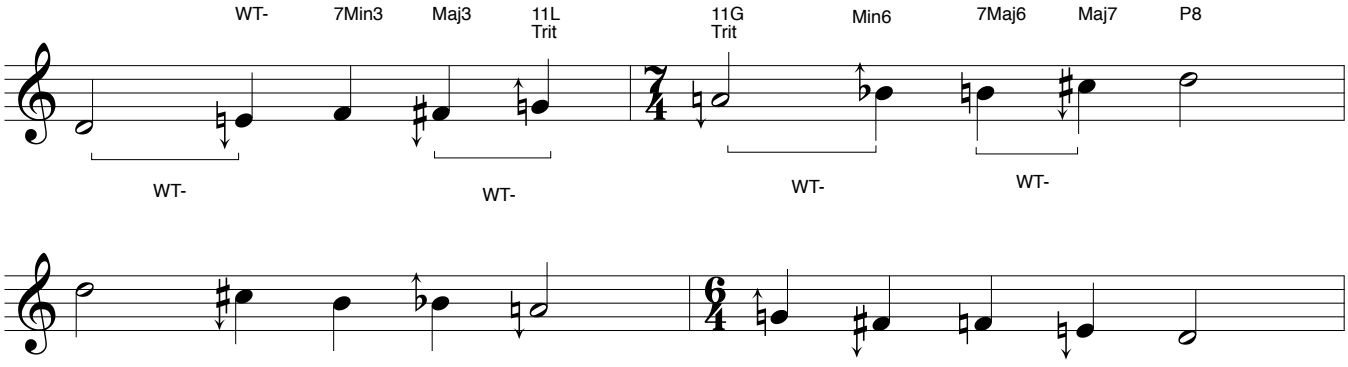
5.1 Orwell[9] 232232323

2 = ST, 3 = WT-



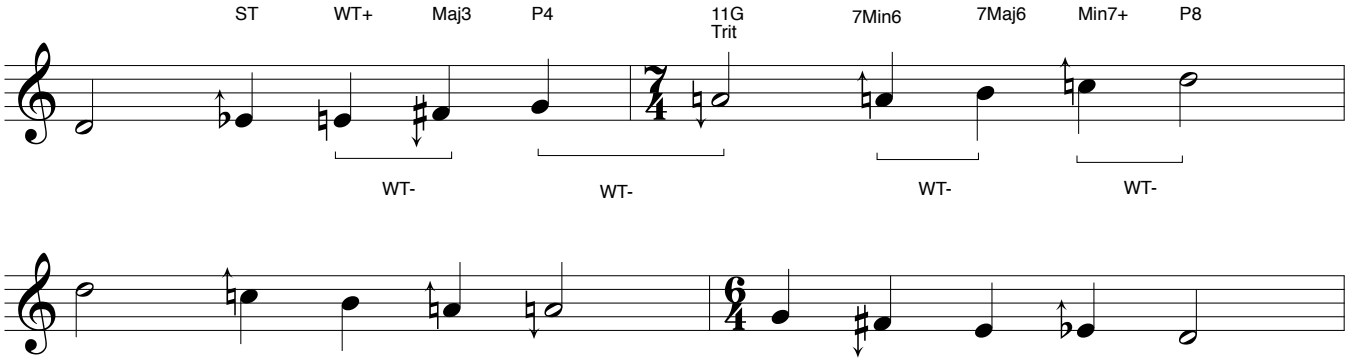
5.2 Orwell[9] 322323232

2 = ST, 3 = WT-



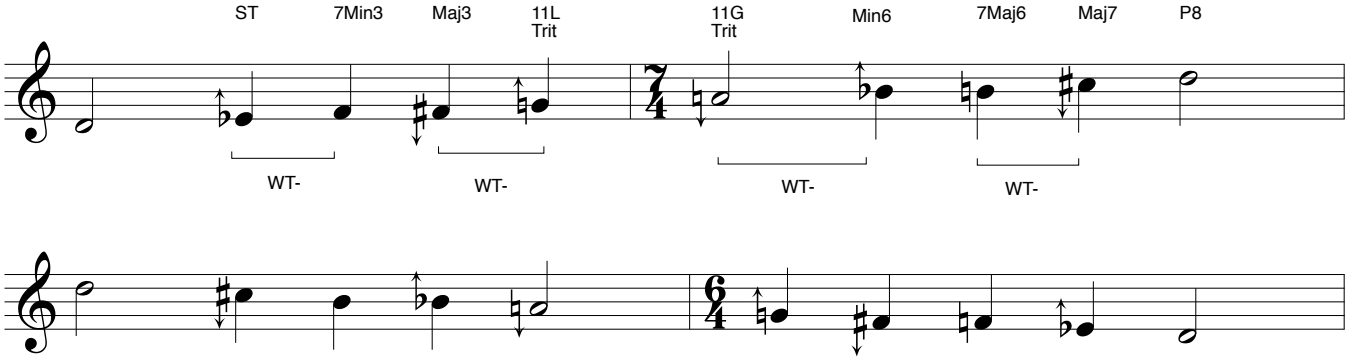
5.3 Orwell[9] 223232323

2 = ST, 3 = WT-



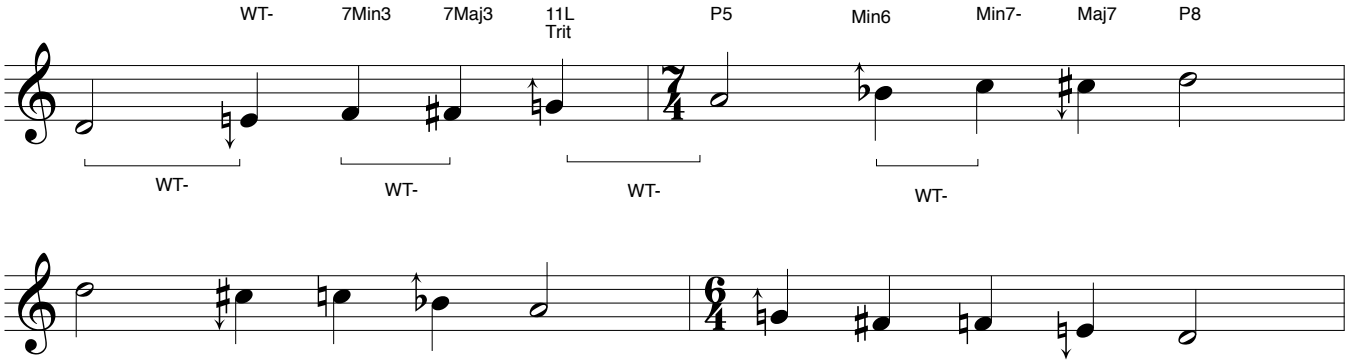
5.4 Orwell[9] 232323232

2 = ST, 3 = WT-



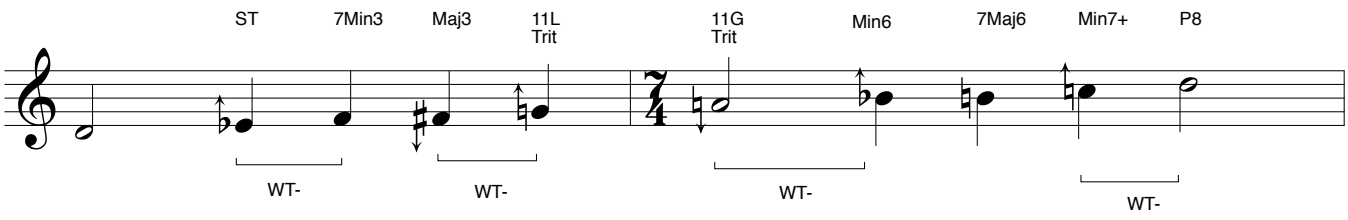
5.5 Orwell[9] 323232322

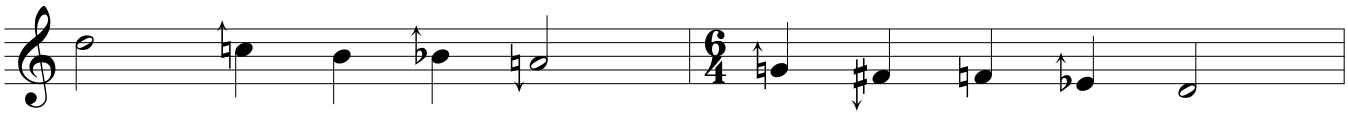
2 = ST, 3 = WT-



5.6 Orwell[9] 232323223

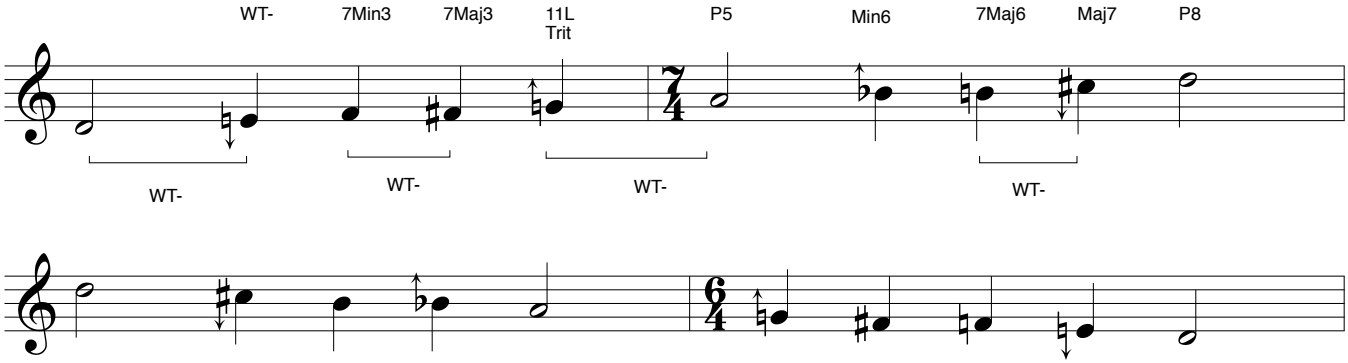
2 = ST, 3 = WT-





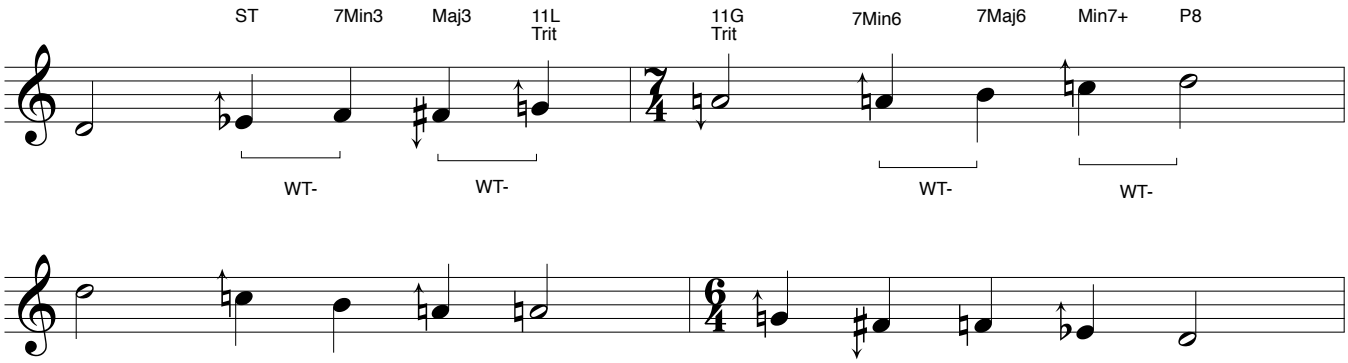
5.7 Orwell[9] 323232232

2 = ST, 3 = WT-



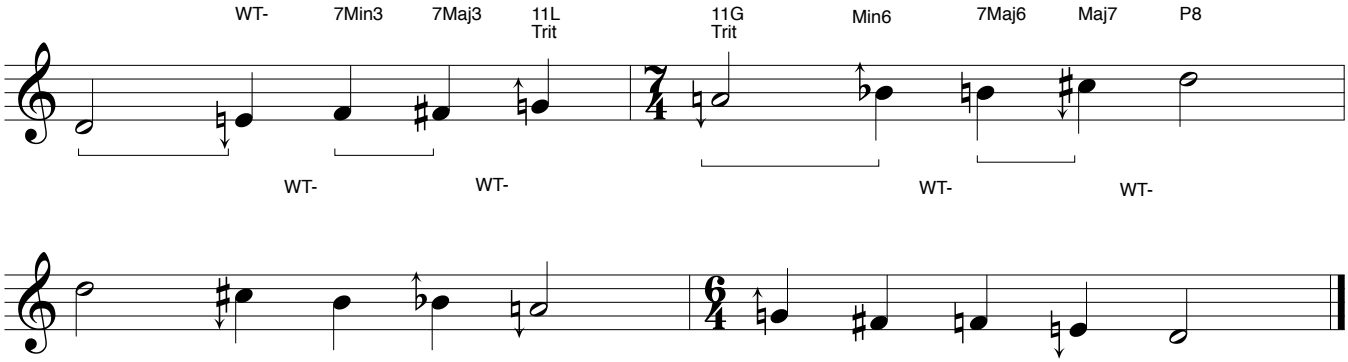
5.8 Orwell[9] 232322323

2 = ST, 3 = WT-

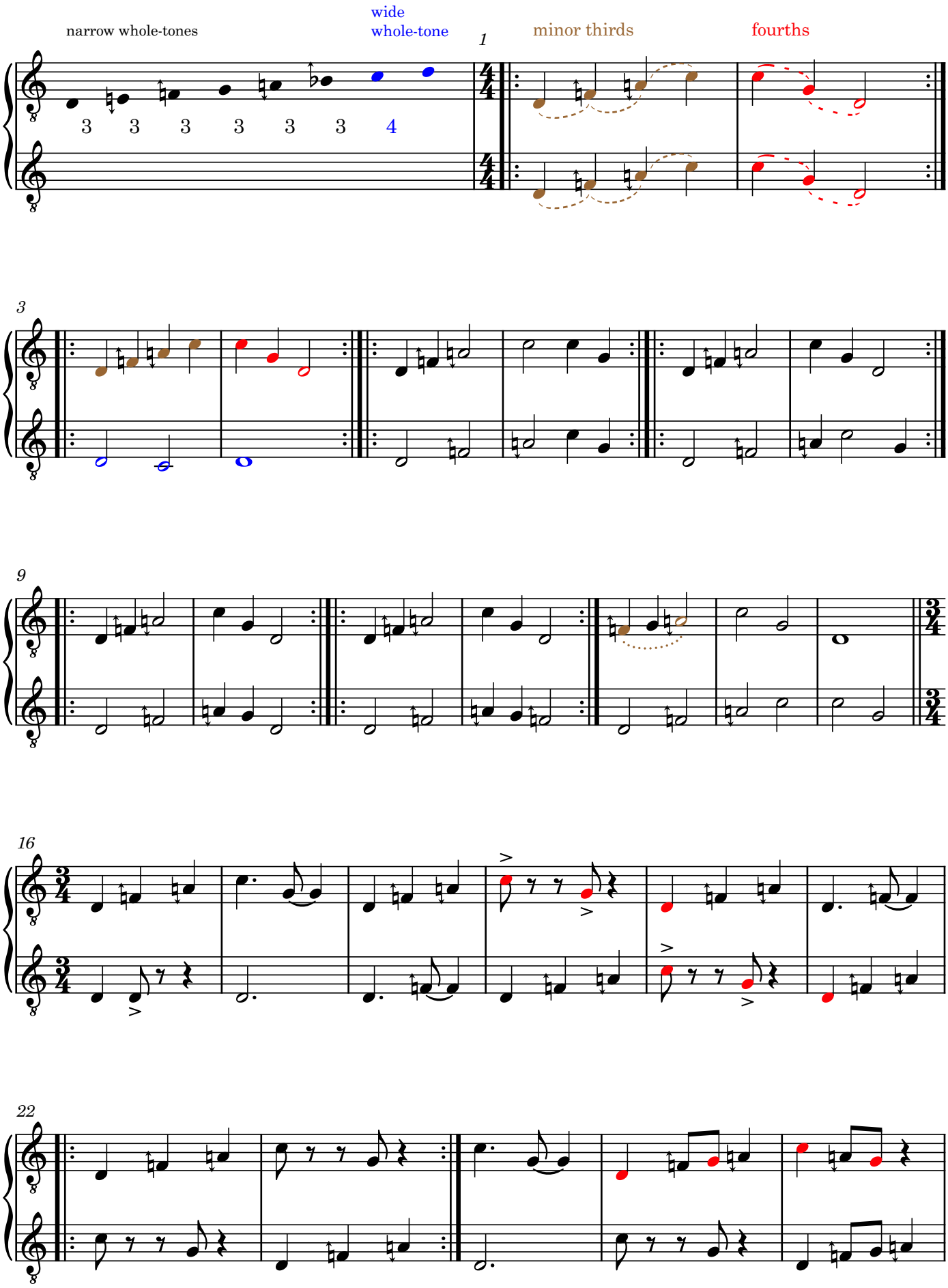


5.9 Orwell[9] 323223232

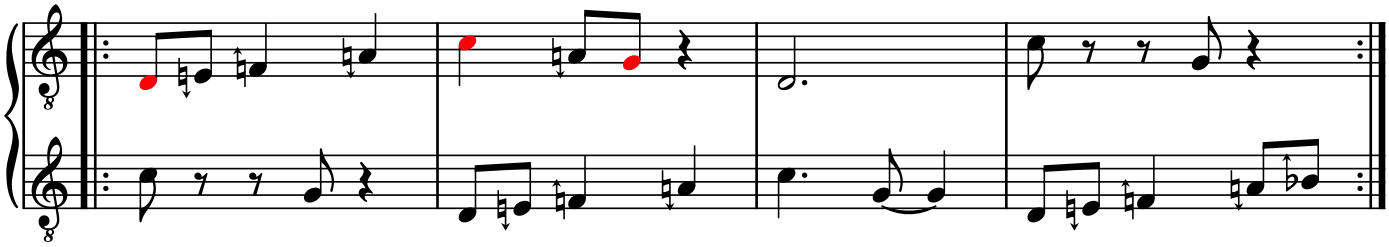
2 = ST, 3 = WT-



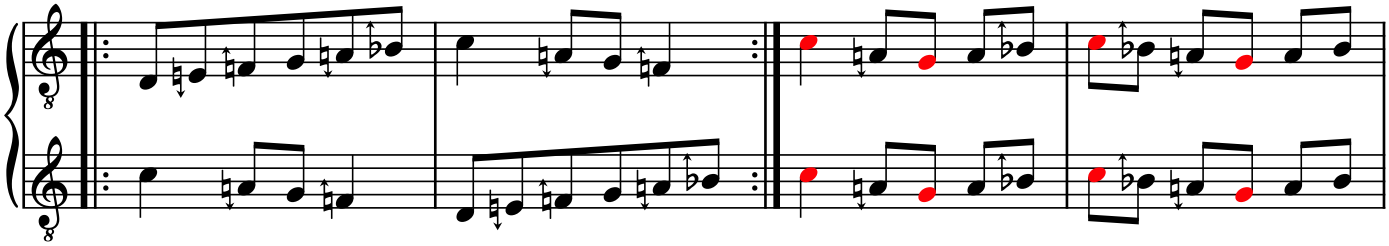
Porcupine Drill 1



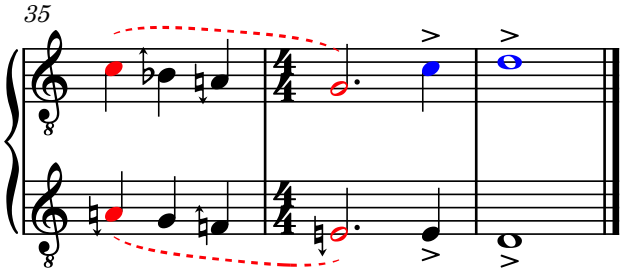
27



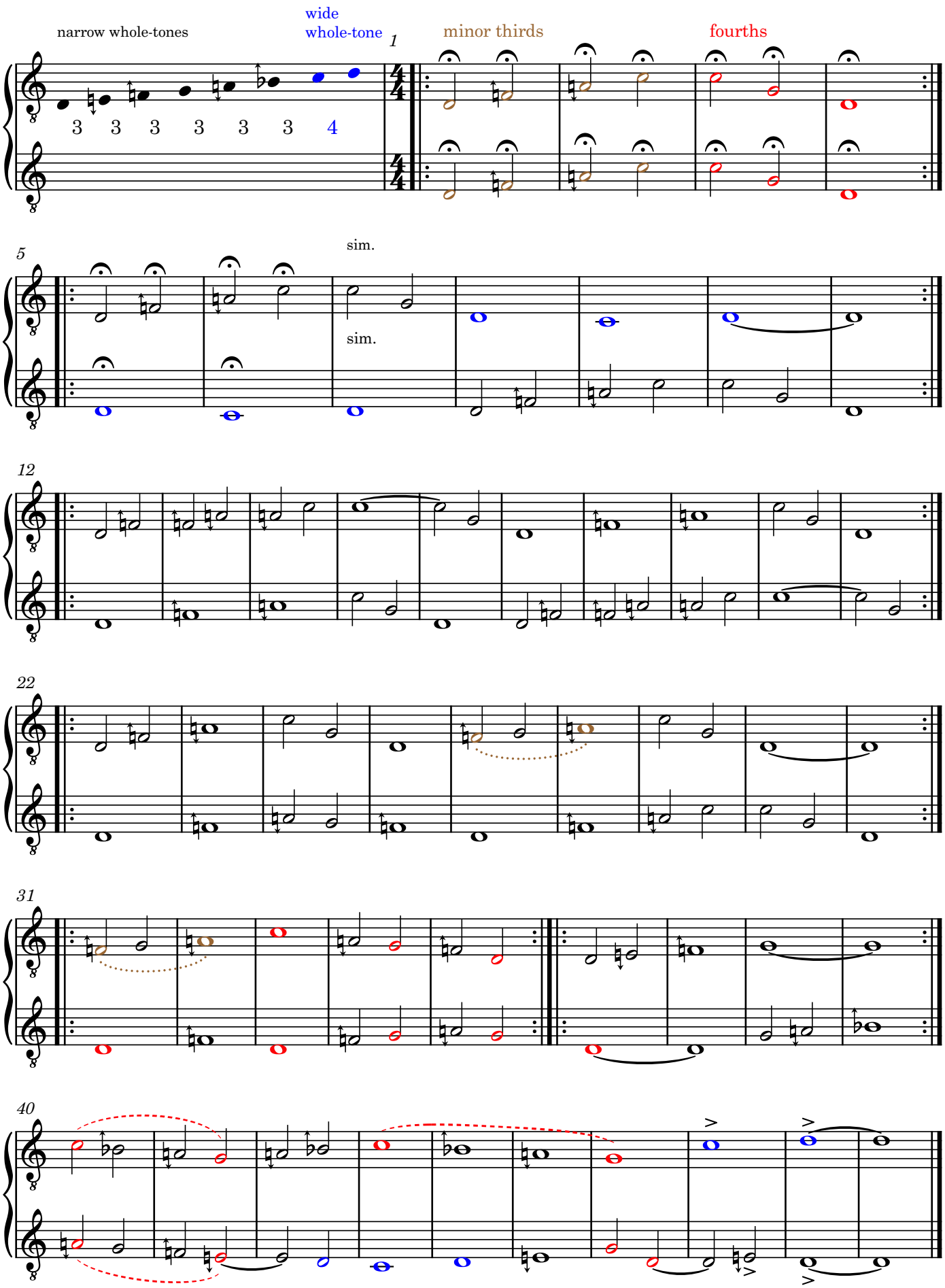
31



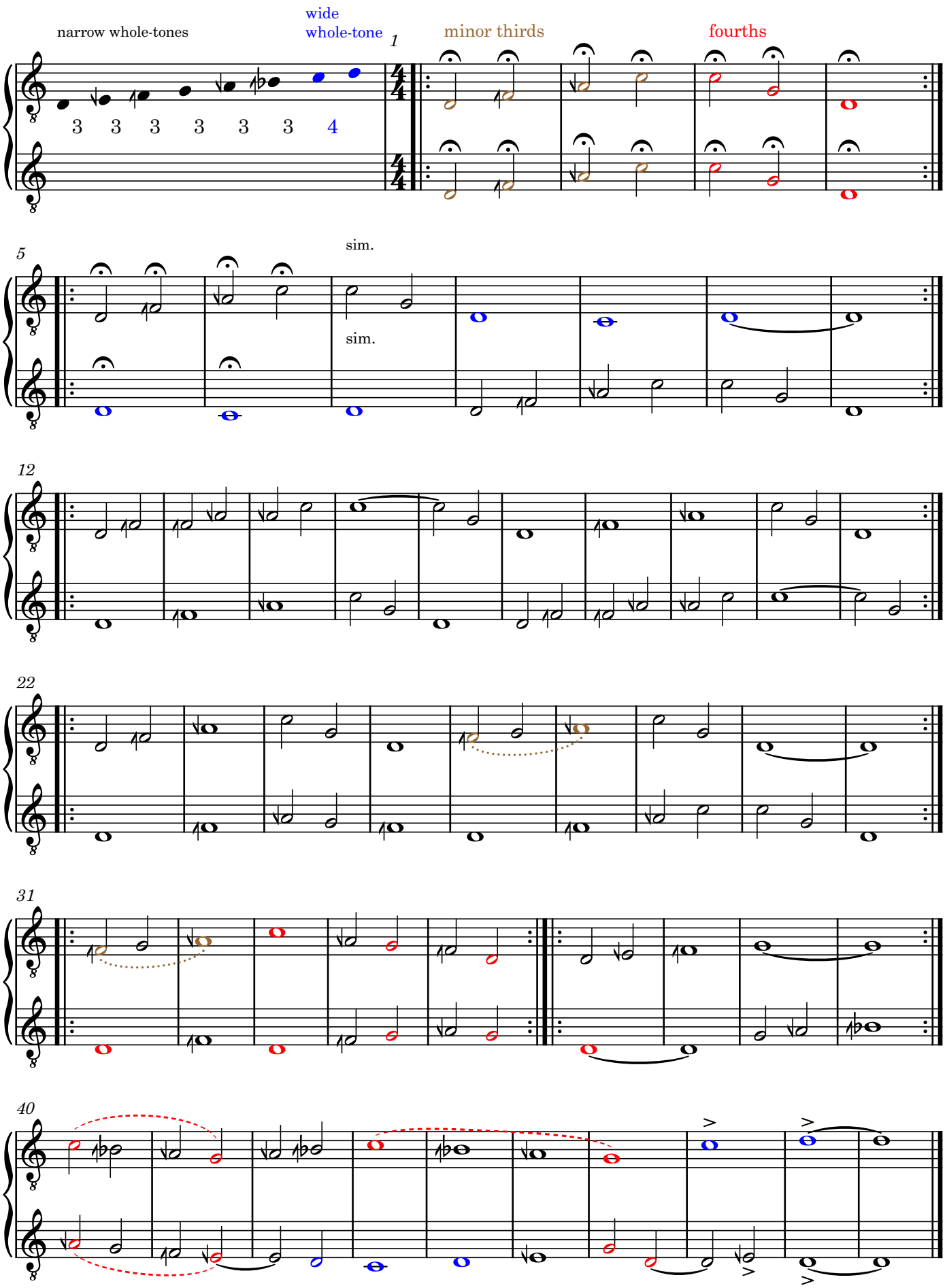
35



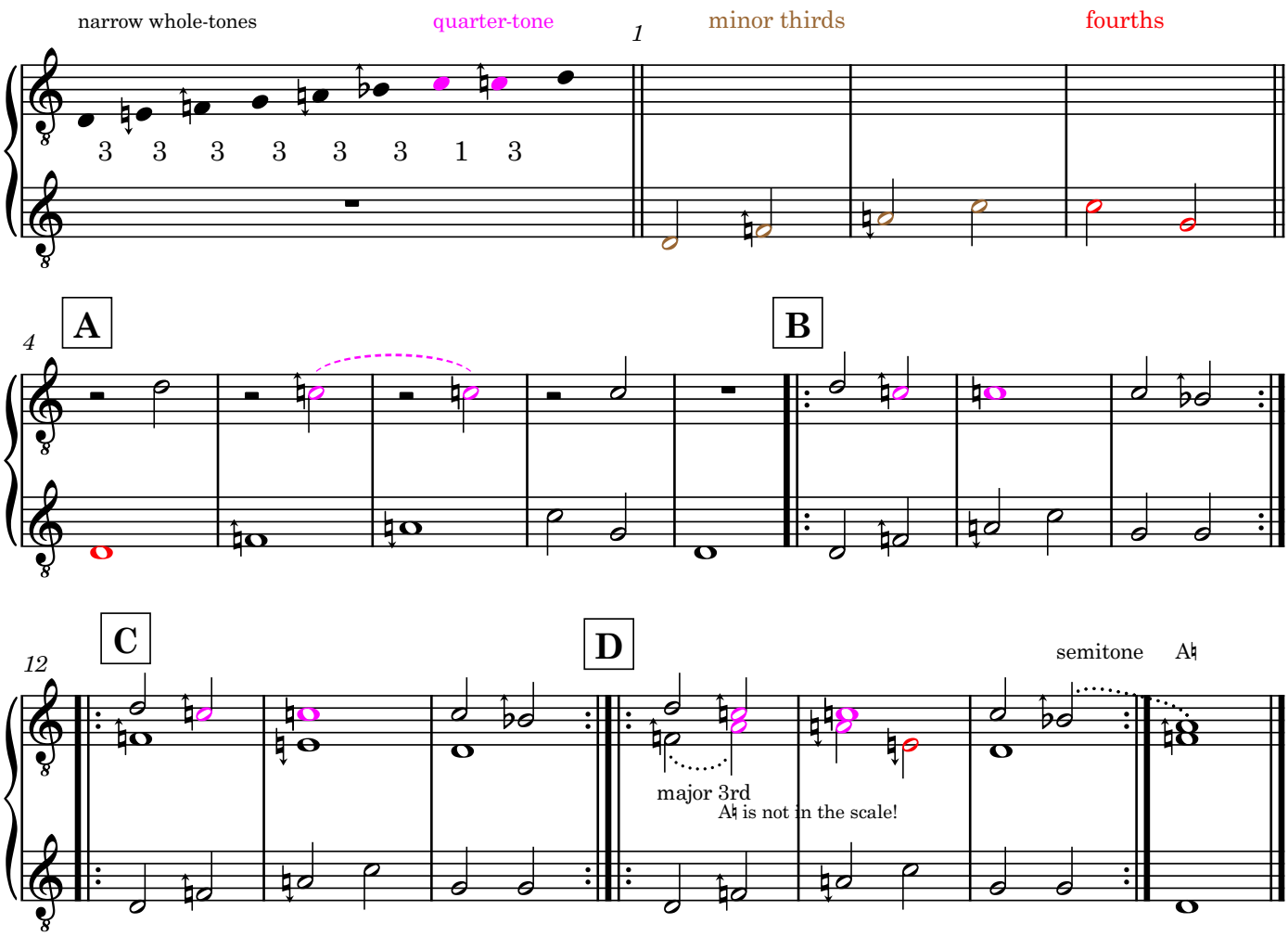
Porcupine Drill 2



Porcupine Drill 2



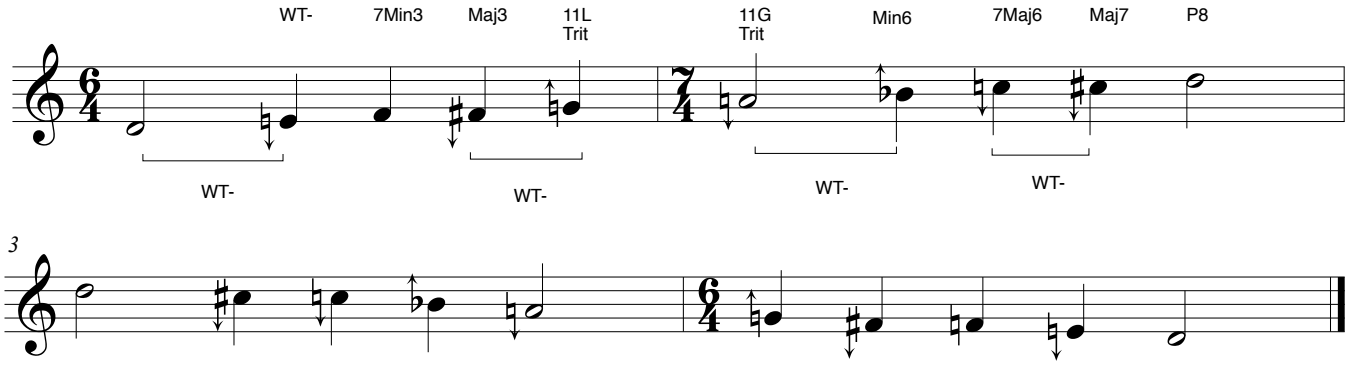
Porcupine Example 1



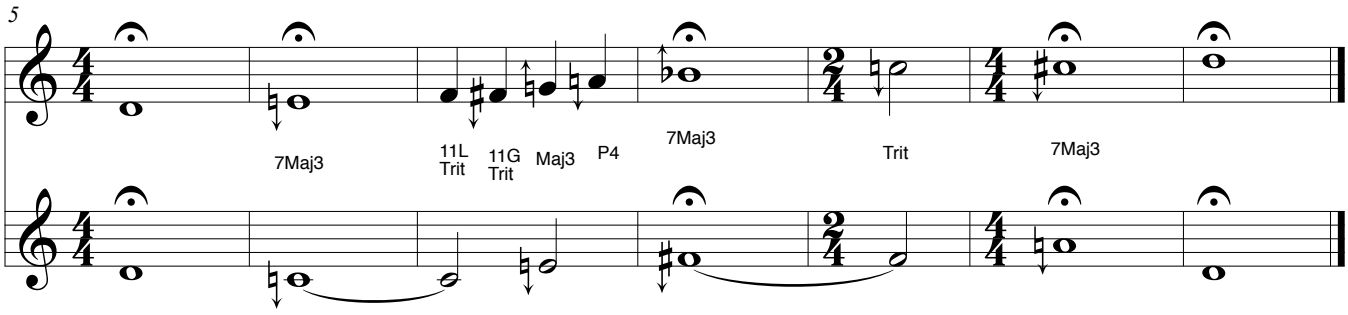
Orwell[9]
little training session

Hans-Gunter Lock

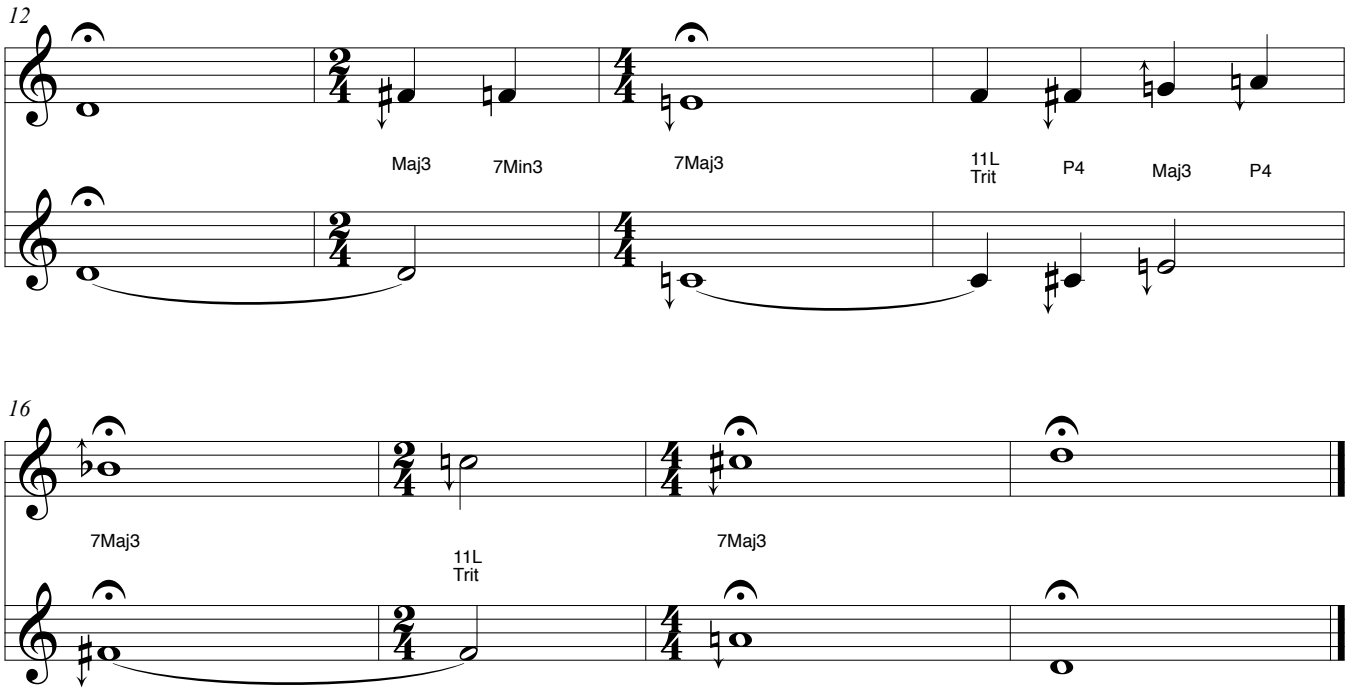
5.2 Orwell[9] 322323232 2 = ST, 3 = WT-



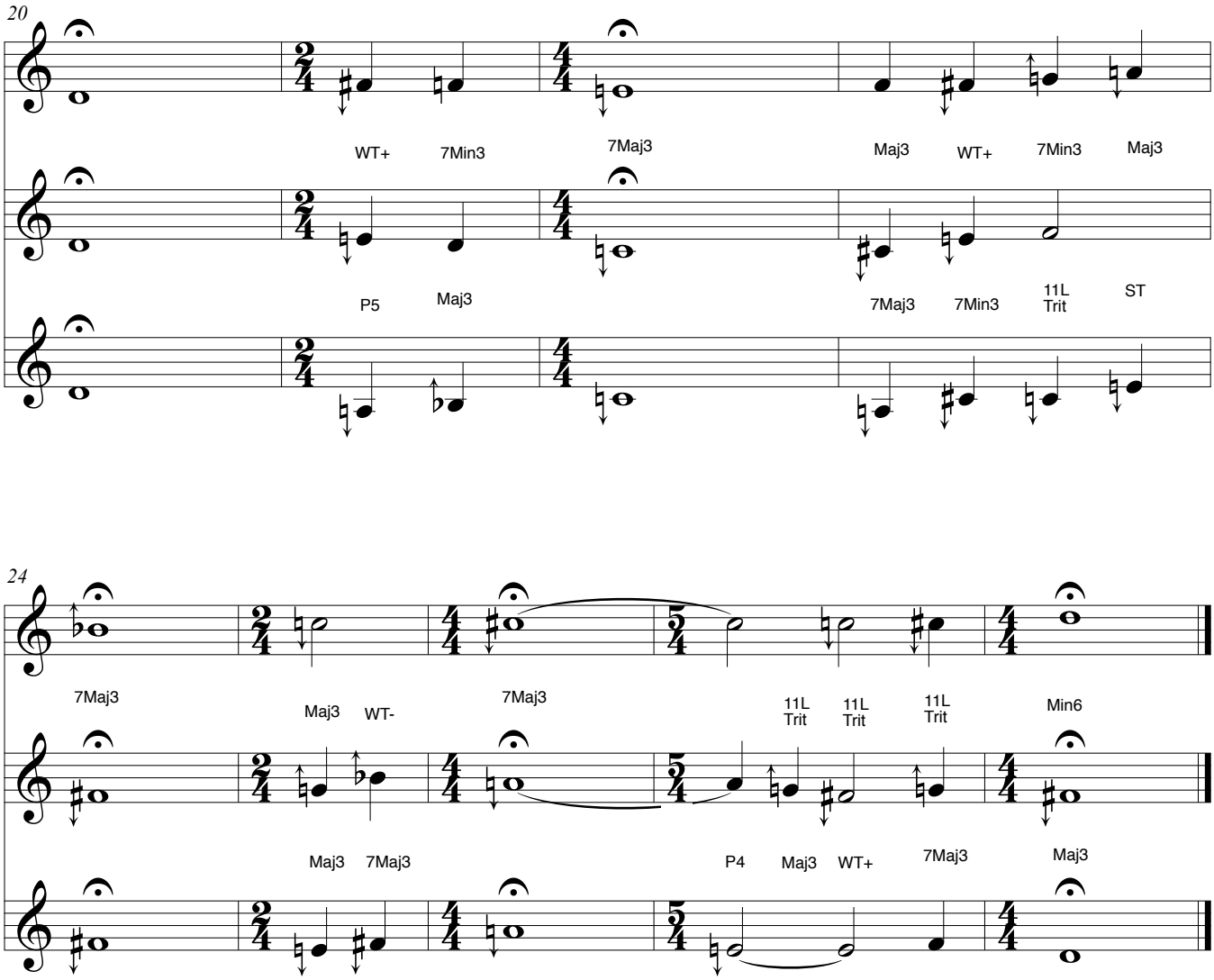
Exercise A



Exercise B

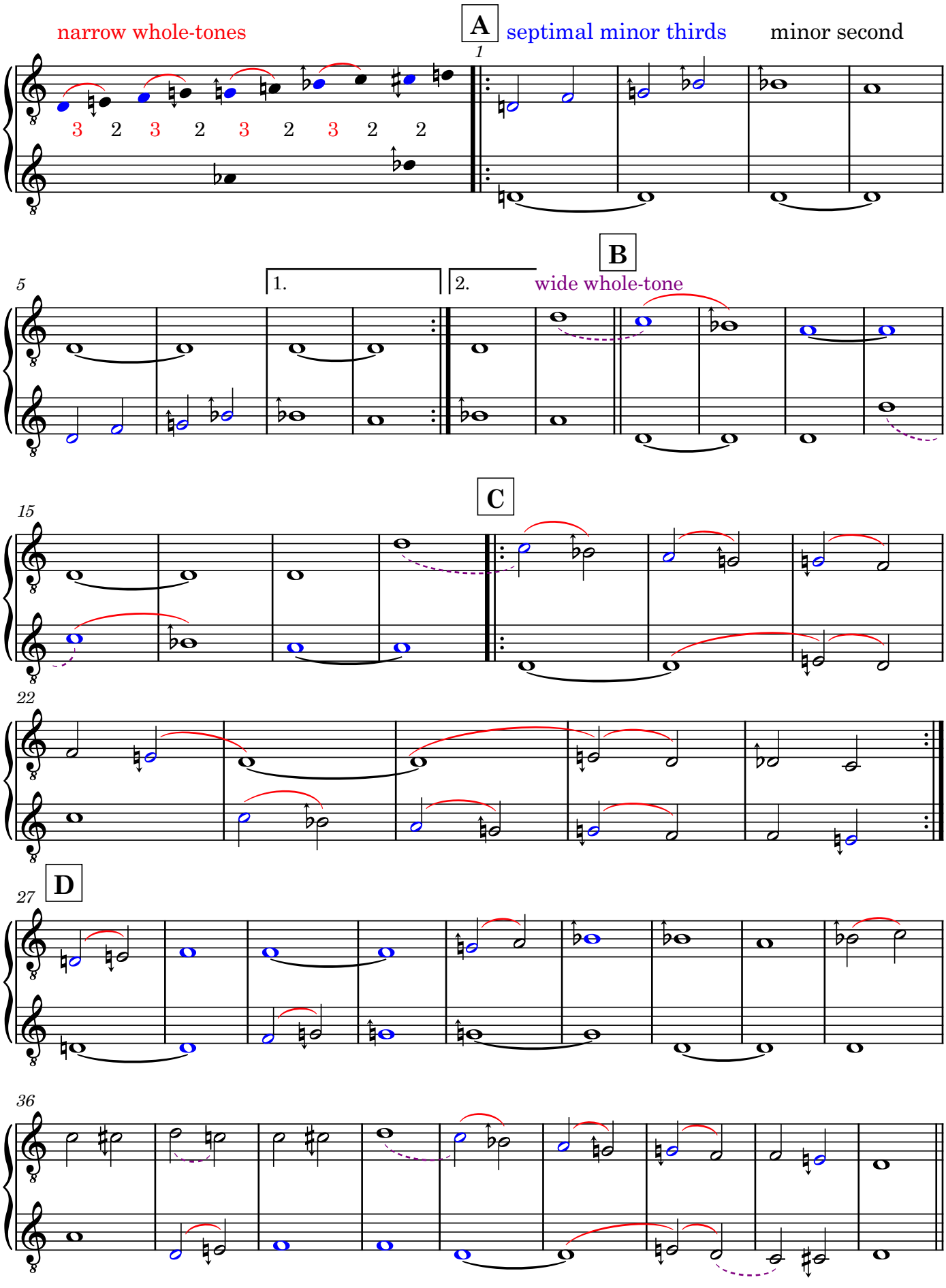


Exercise C


20
WT+
7Min3
7Maj3
Maj3
WT+
7Min3
Maj3
P5
Maj3
7Maj3
7Min3
11L
Trit
ST
24
7Maj3
Maj3
WT-
7Maj3
11L
Trit
11L
Trit
11L
Trit
Min6
Maj3
7Maj3
P4
Maj3
WT+
7Maj3
Maj3

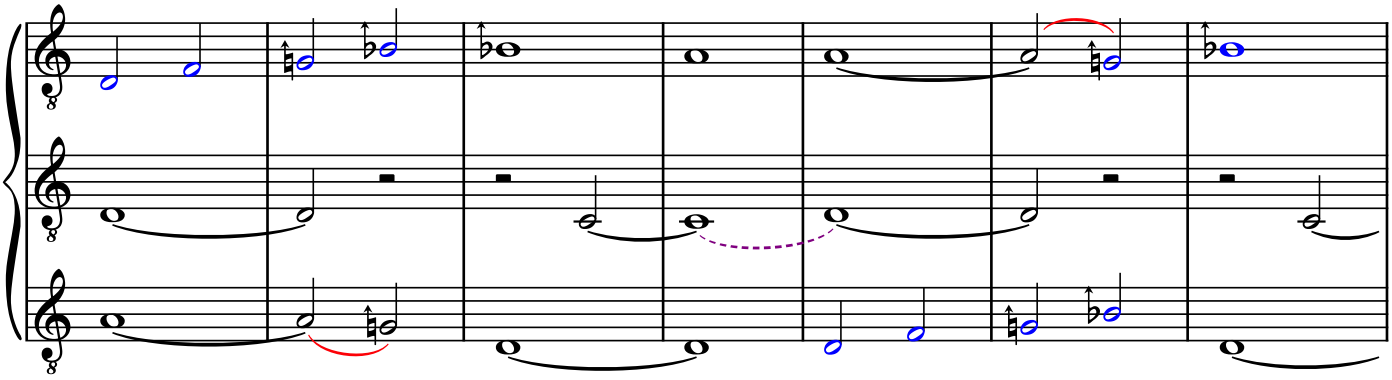
Orwell Exercise

Juhani N.

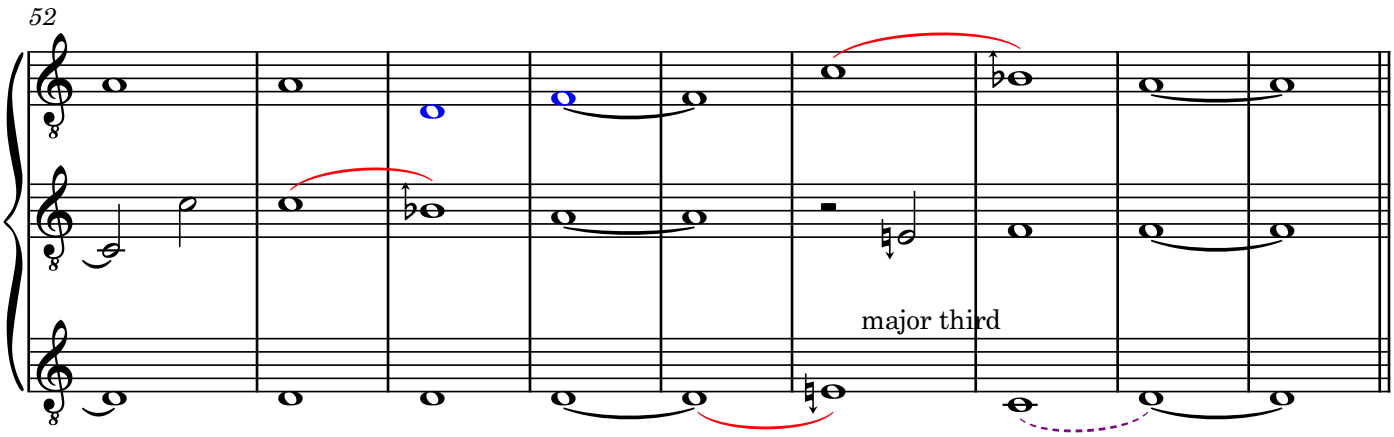


E

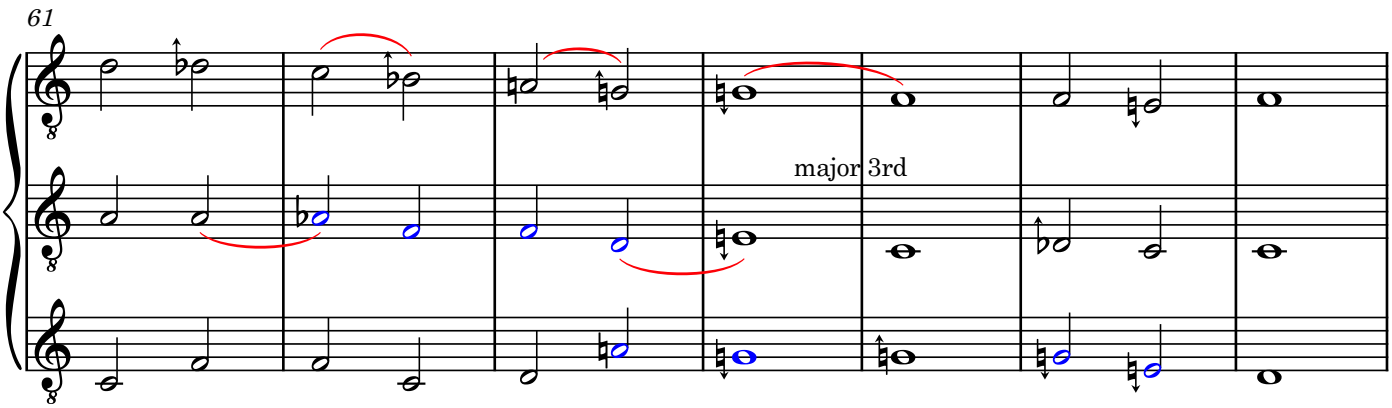
45



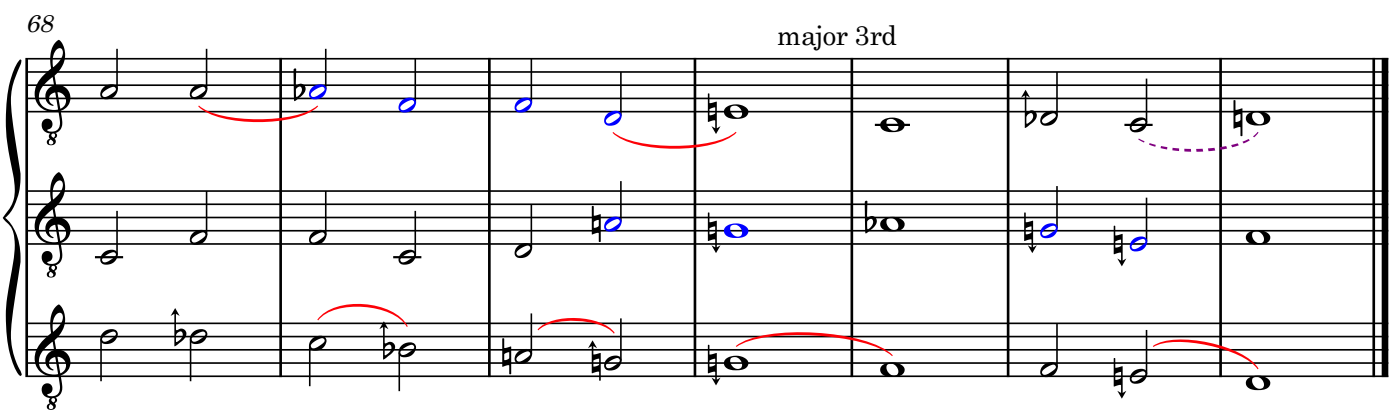
52



61



68

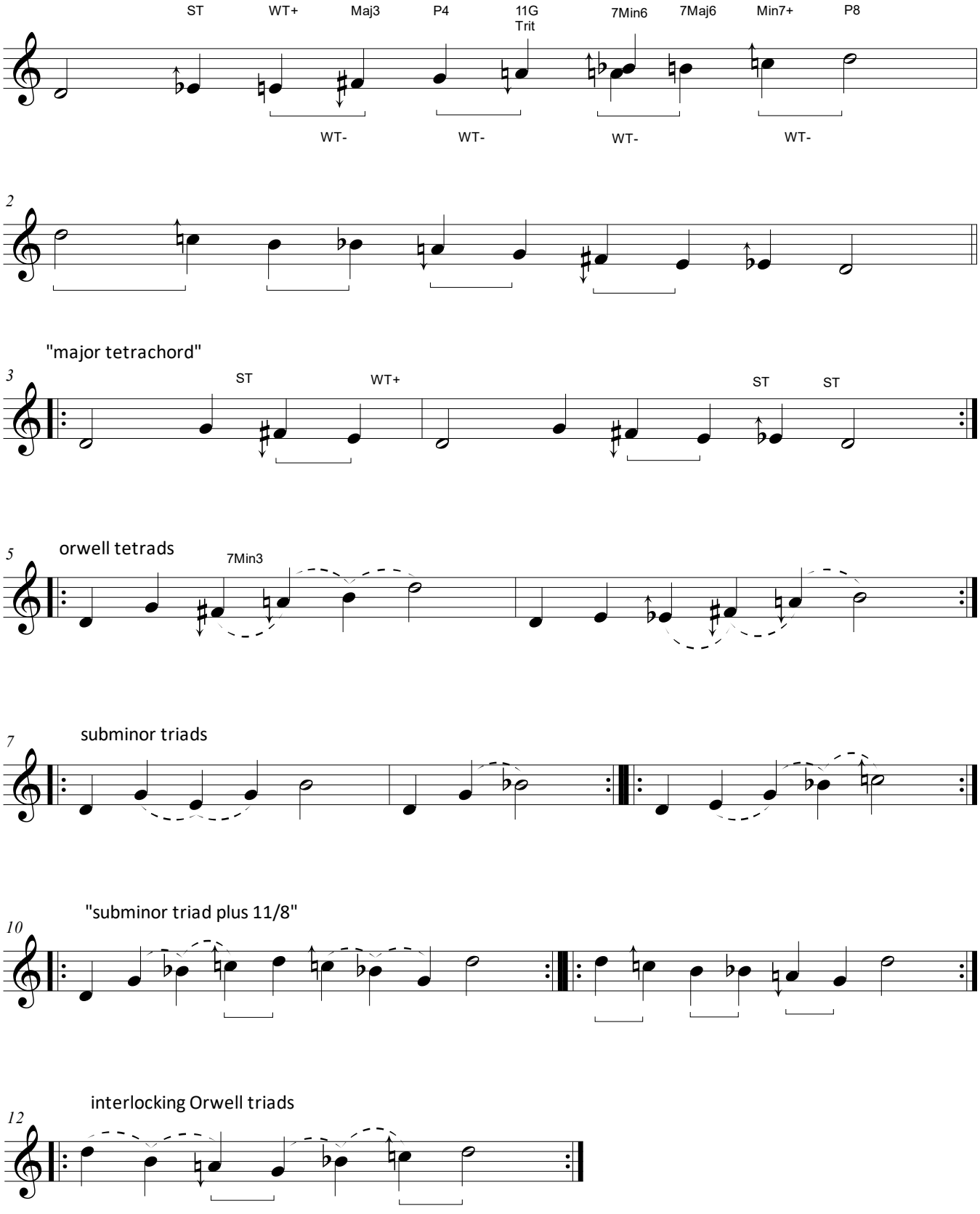


Exercise in a mode of Orwell[9]

Sebastian Dumitrescu
modified from original file by Hans-Gunter Lock

5.3 Orwell[9] 223232323

2 = ST, 3 = WT-

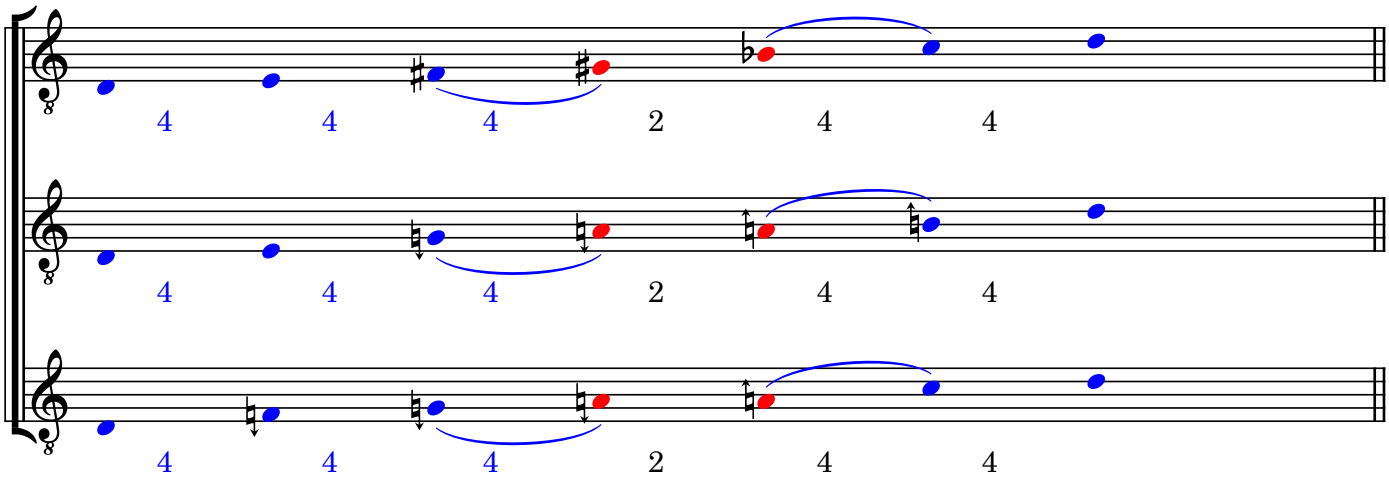


Gradus

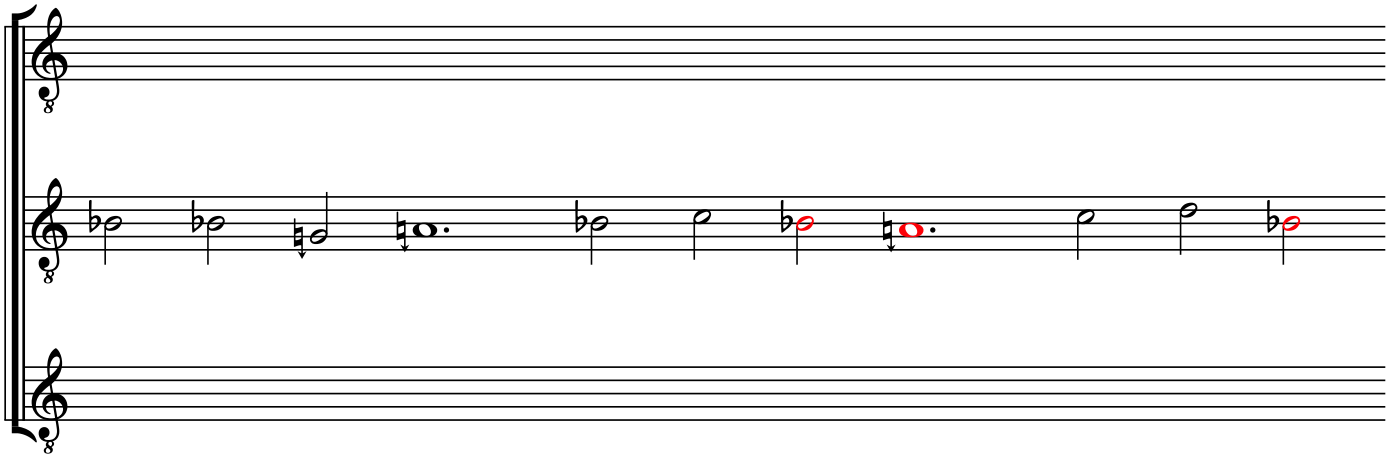
Juhani

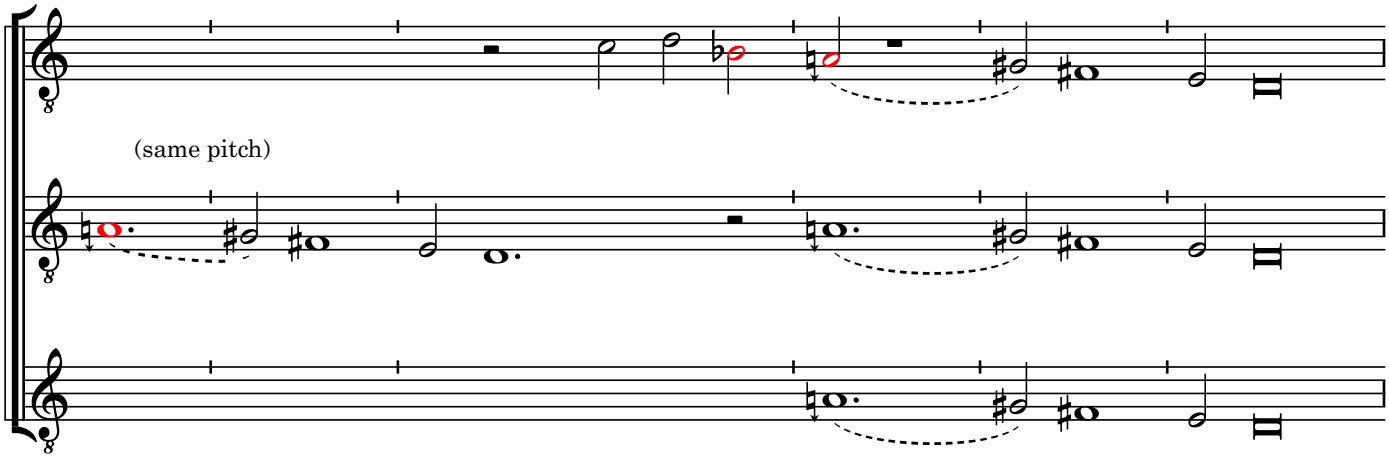
Machine[6]

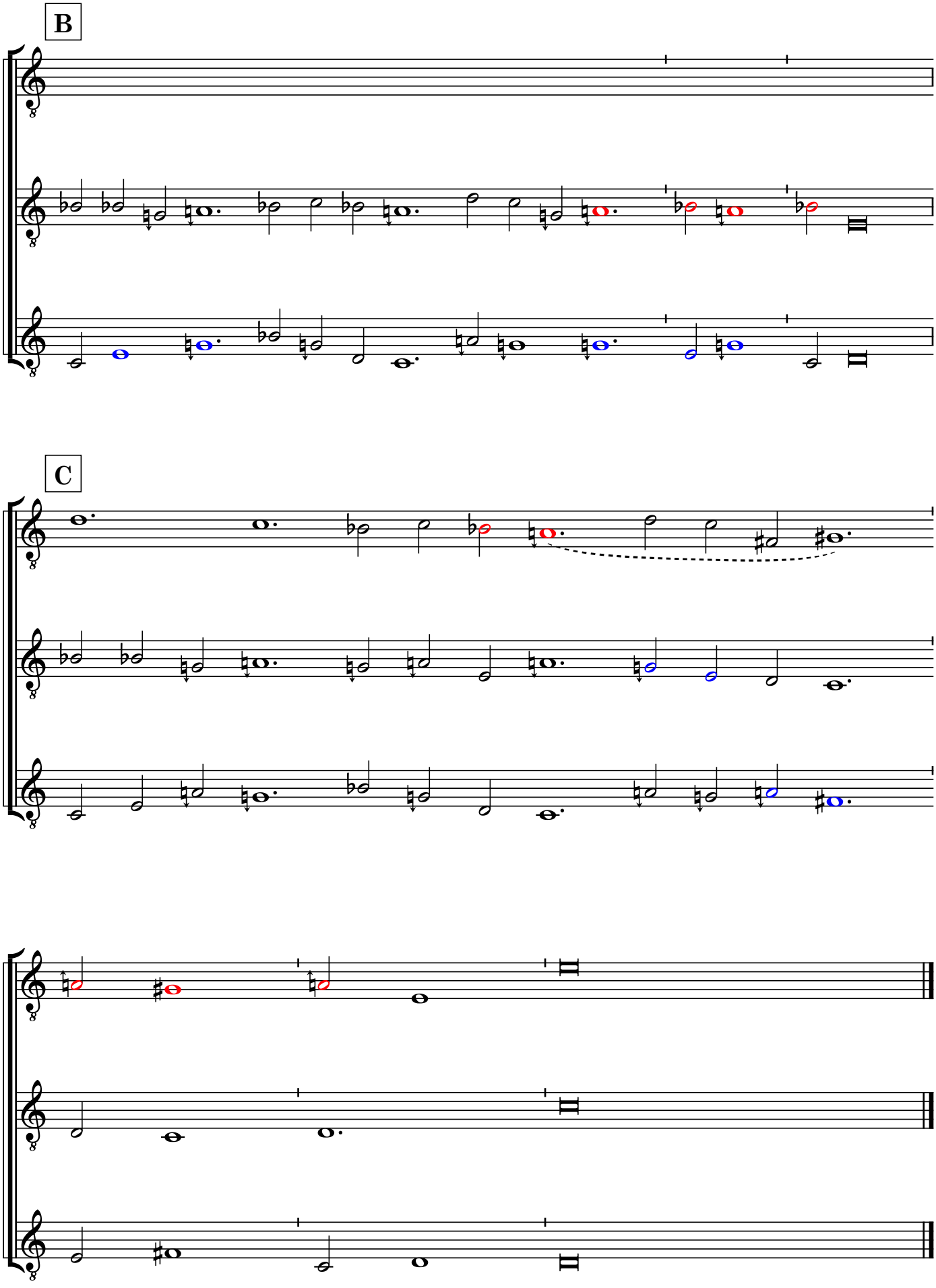
wide whole-tones and semitone



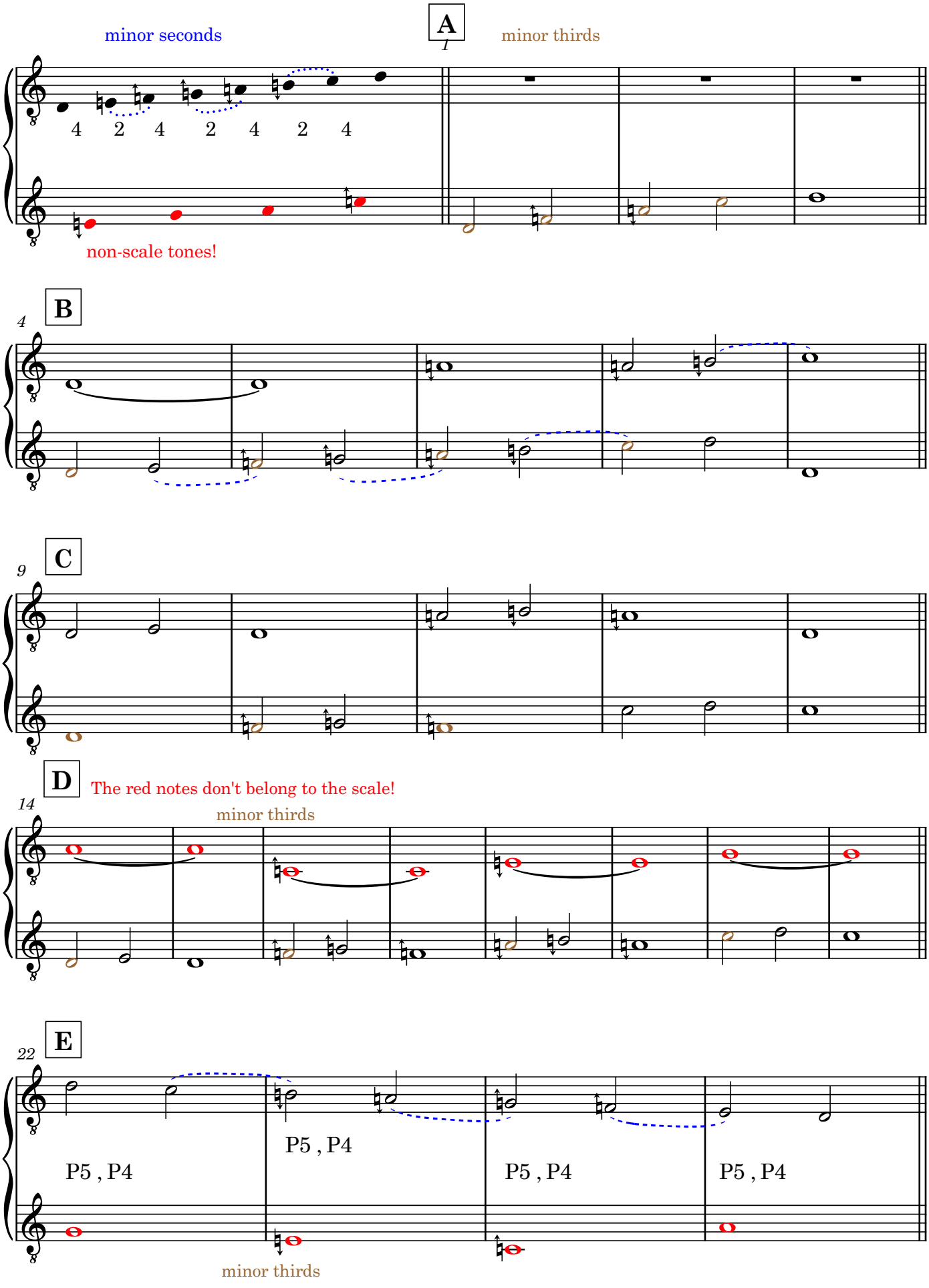
A

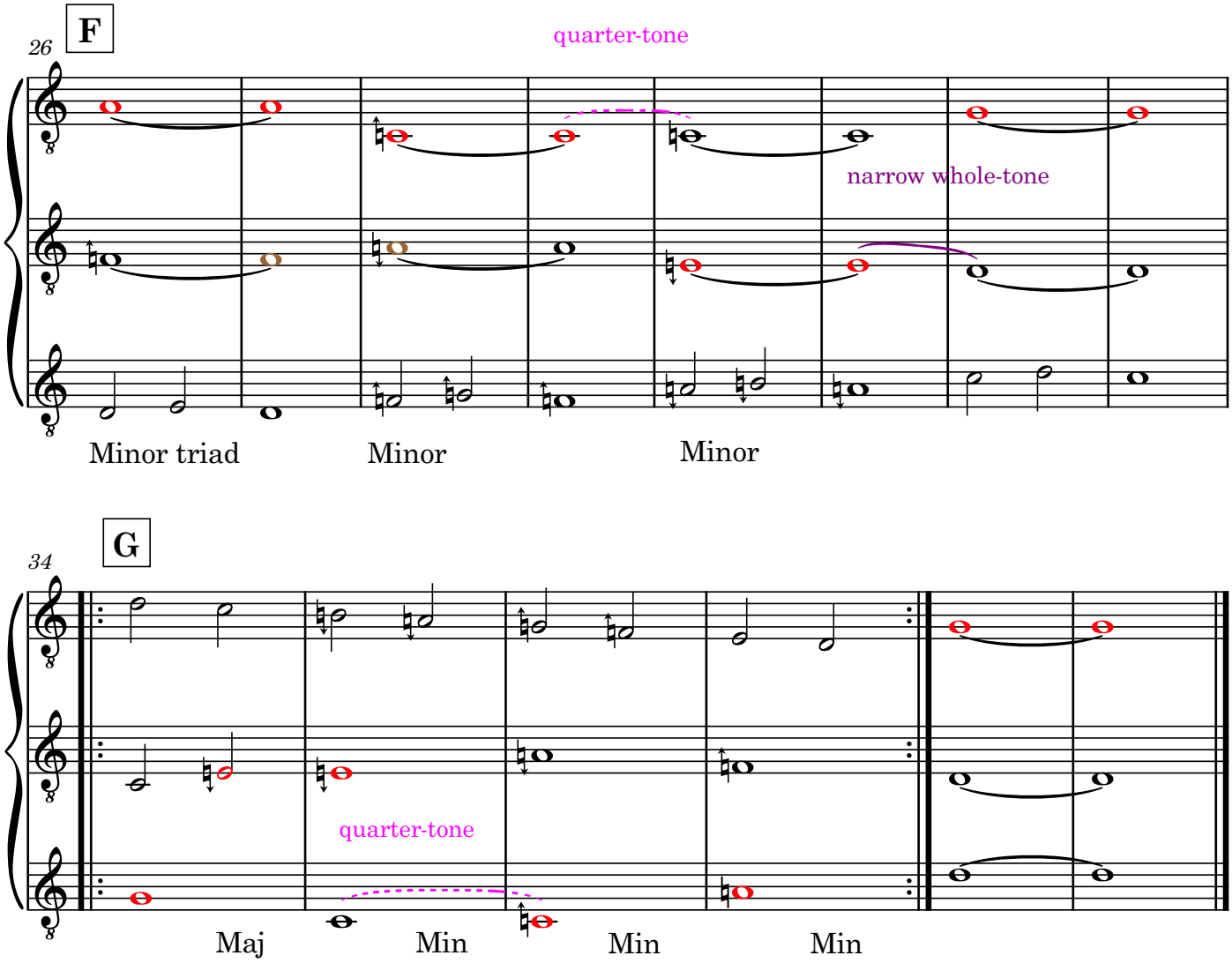





B
C

Orgone Exercise

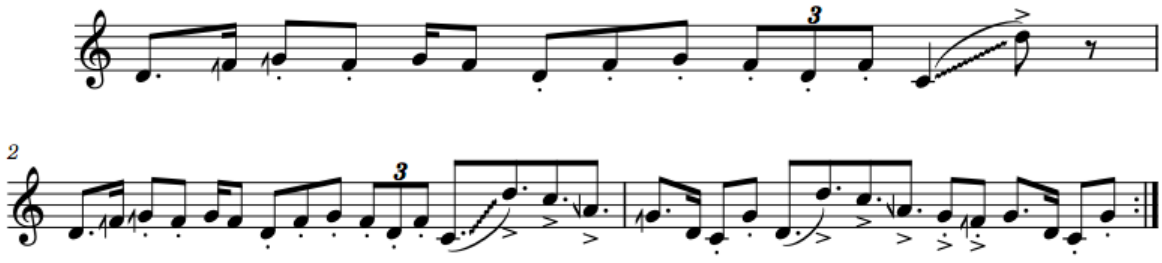



26
F
quarter-tone
narrow whole-tone
Minor triad
Minor
Minor
34
G
quarter-tone
Maj
Min
Min
Min

for Kazoo

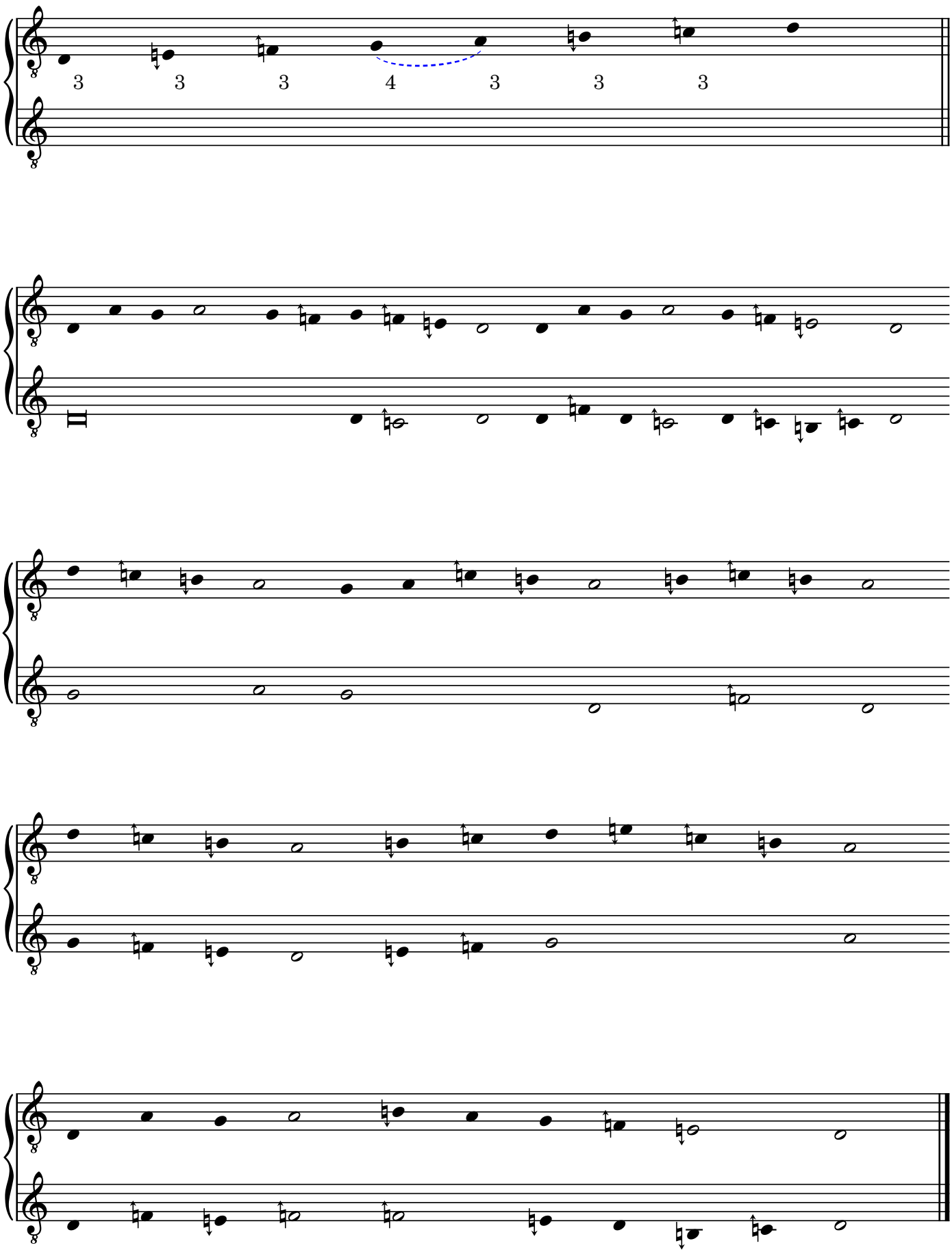
Octothorpe, Section A

Jacob Barton



Porcupine Organum

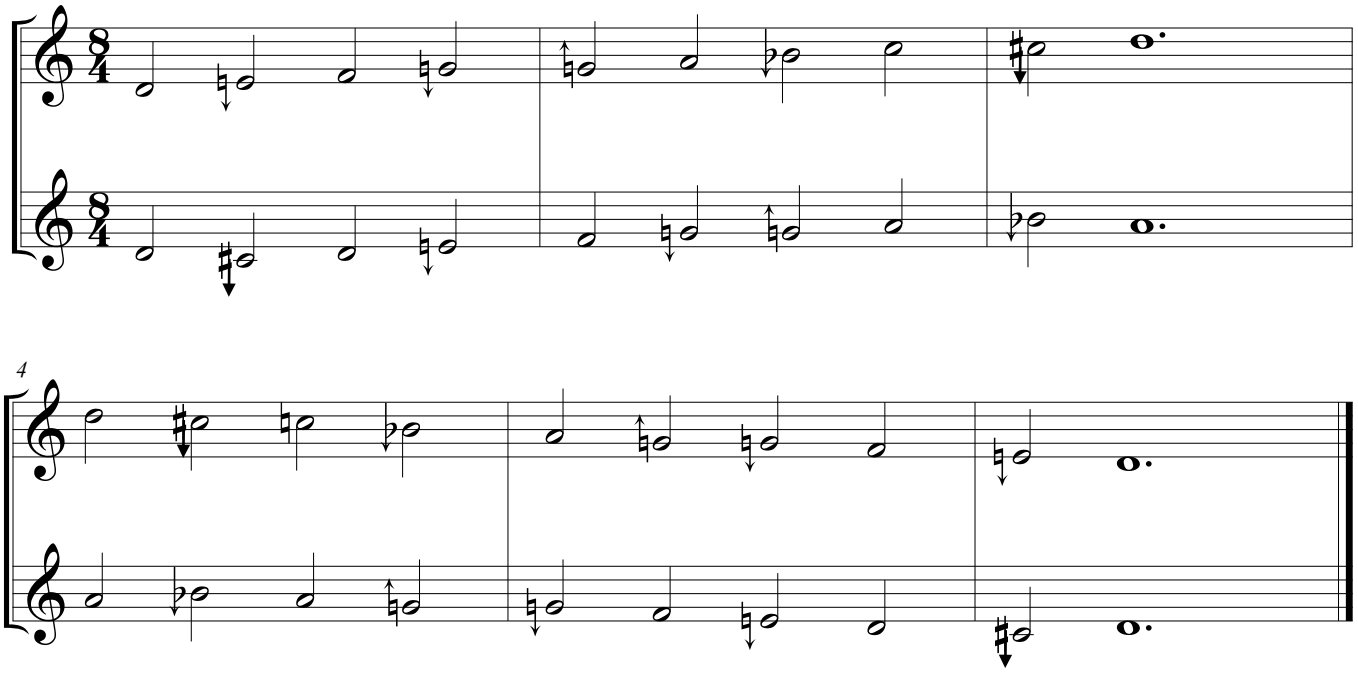
major second



väiksed

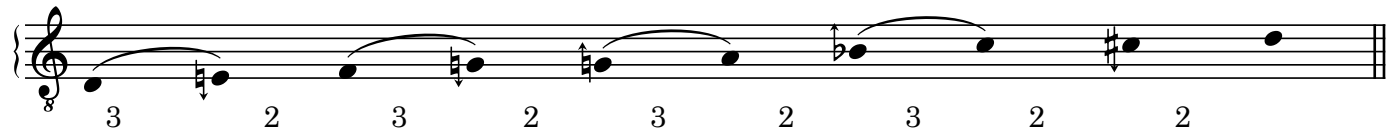
Harjutus: Orwelltertsid

Hans-Gunter Lock



Dies irae

Orwell temperament



narrow whole-tones