

HOTPO

for solo alto saxophone and computer

10

421

426

435

441

445

448

451

454

B-5+c3 B+c3
E+c3 C-5+C3

E+c3

B+C E+c3, c5 B+E

E+c3 B+c3 C-5+C3

E+c3

B-5+c3

sing:gliss:up

B-C B+E

sing:gliss:up

sing:gliss:up

Tempo I

slower $\downarrow = 96$

15

E+c3 C-5

B-5,6 B-C E+c3, c5

E+c3

E+c3, c5 B-6 B-5 B-C B-5

B-5,6 B+E

E+c3, c5

sim: >

B-C B+E B-5,6 E+c3 B-5,6 E+c3, c5

C-4 B-5 B-6

C-5 C-4 B+C B-5,6

C-4 E+c3

E+c3, c5 B-5,6

E+c3 B-6 B-5 C-5

B-6 B-5 trill B

C-5 C-4 B+E

pp

mp

f

p

mf

mf

sfz

mf

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HOTPO
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programme note

Hinting at something a little more coarse, the title *HOTPO* is in fact a completely innocent reference to the Collatz Conjecture. This mathematical proposition, also known by other names, refers to a succession of numbers called the hailstone sequence (or wondrous numbers), because their values usually ascend and descend like hailstones in a cloud.

Though the mathematical proof of the conjecture is complex, the proposition is very simple: Take any positive whole number; if it is even, divide it by two; if it is odd, multiply it by three and add one (hence the acronym Half Or Three Plus One: *HOTPO*); repeat the process with the result and you will find that no matter which number begins the process, you will always, given enough iterations, reach one.

The algorithm is easy to programme and experiment with plus it produces rather nice images when given different starting numbers and plotted over various iterations. I used the algorithm in this piece to generate section lengths and repeated structures from nine basic rhythm sequences, hence my sequence was 9 28 14 7 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1. The piece alternates sections opposing mixed materials (odd section numbers) with obsessively repeated material (even). The numbers are also used for the generation of the sound files triggered during the performance. Despite the rather abstract nature of the generative procedure, the results of the algorithms were developed intuitively and the piece as a whole arises out of and proceeds through a maelstrom of events fitting to the imagery of a hailstorm.

HOTPO was commissioned by Henrique Portovedo for the World Saxophone Congress 2018 in Zagreb. That version included an ensemble. In 2020 I reworked the sound files to include MIDI data from the ensemble and made a solo + computer version. This was revised in 2024.

key to symbols

- round white with dot noteheads in the sax part indicate subtones (e.g. middle C at letter D)
- x noteheads indicate slap tongue (choose the best type of slap effect for the given dynamic but always ensure the indicated pitch is audible; if the slap is pp, then it is more of a tongue click than a slap proper)
- accents on tied notes indicate a diaphragm accent (smorzato)

notes

- the saxophone is to be amplified; an 'electric' sound is the goal, not merely transparent amplification; the computer part should be mixed into the same front-of-house speakers that the sax is projected from.
- sing:gliss:up means sing/growl whilst playing a tone then glissando up on the sung note; sing by itself means just sing/growl whilst playing a tone but hold the sung note steady; in both cases the the pitch of the sung note is ad libitum but the effect in every case should be a wild, raucous tone (think Archie Shepp).
- sax at letter G: the held pp multiphonics should not be spectrally static, rather they should change colour during the whole duration; they should also not be dissonant but very gentle instead, even 'covered' if necessary.
- a slap tongue tied to a normal note—or any non-short slap—always implies that the slap attack is followed by a normal tone, without re-attack.

computer

- Requirements: laptop running MaxMSP (version 7 or above; no licence required); high-quality stereo output sound card (no inputs necessary); MaxMSP patches and sound files (available upon request by sending an email to m@michael-edwards.org)
- The score indicates with a red downward arrow when a stereo sound file should be triggered (usually by the performer, using a pedal)
 - after the beginning, the red arrow has a number nearby: this indicates the queue number you should see on the max patch.

alto saxophone

HOTPO

michael edwards 2018/2024

wild $\text{♩} = 144$

E^b-2
 E^b-3

mf \leftarrow ff

mf \leftarrow ff

A

sim.

sim.

ff

accelerando

$\text{♩} = 160$

Tempo I

1

2

40 **B** *ff* *mf* *ff* *mf* *ff*

E^b-2 E^b-3 E^b-2 E^b-2 E^b-2

sing:gliss:up sing:gliss:up

46 *mf* *ff*

B^b-C B^b+E^b

sing

54 *f*

E^b-3 E^b-2

sim. sim.

C

62 *p sub.* *mf* *pp* (delicatissimo!) *4*

$B-5+c3$ B^b+c3

$E+c3$ $C-5+C3$

suddenly delicate, slower $\text{♩} = 126$

D $E+c3$ E^b-2 $B^b-2,6$

68 *pp* *1* *5* E^b-2

$B^b-2,6$ E^b-3

76 *1* *3*

$E+c3$ $B+c3$

$B-5+c3$ $C-5+C3$

82 *pp* *p* *6* *7* E^b-2 E^b-3

$G+c1$

92 *pp* $G+c1$

101 **1** b^{\times} b^{\times} **1** b^{\times} b^{\times} b^{\times} **8** b^{\times}

109 $E+c3$ $E-2$ $B^b-2,6$ $E-3$ $G+c1$

pp *pp* *pp*

116 **1** E^b-2 E^b-3 $B-2,6$ $p > ppp$

123 *mp* *pp* *pp* E^b-2 $p > ppp$

accel.

130 *mp* *pp* E E^b-3 E^b-2 p *cresc.* sing:gliss:up sing:gliss:up

$\text{♩} = 136$ *stringendo*.....

137 B^b-C B^b+E^b *sim. to F*

141 *mf* *cresc.*

release: slower $\text{♩} = 126$

145 **Tempo I** $B-5+c3$ B^b+c3 $E+c3$ $7:6$ $C-5+C3$ p ppp **6**

Tempo I

153 **F** E^b-2 B^b-C B^b+E^b
 E^b-3 sing:gliss:up E^b-3 sing:gliss:up
 1 3 3 1 1

159 $E+c3$ B^b+c3 E^b-2 sing:gliss:up
 $B-5+c3$ $C-5+C3$ E^b-3
 7:6 7:6 3 3 6 1
 p pp

169 $E+c3$ $B-5+c3$ 2 1 5
 pp f

179 1 $B-5+c3$ $E+c3$ $C-5+C3$ $E+c3$ $B-5+c3$ B^b+c3
 7:6 7:6 3
 mp pp p sempre pp

184 $E+c3$ $B-5+c3$ $C-5+C3$ B^b+c3 7 1
 7:6 7:6
 slaps as close to pp as possible

195 2 1 $C-5+C3$ $E+c3$ $B-5+c3$
 7:6
 (pp)

201 $B-5+c3$ $B+c3$ $E+c3$ $C-5+C3$ 3 7:6 $C-5+C3$
 7:6 7:6

206 6 1

216 C-5+C3 B^b- C B^b+E^b sing:gliss:up

(pp) p

222 slower ♩ = 126 9 Tempo I

C-5 B-5 B^b+E^b E^b-3 E^b-2 sing:gliss:up

pp mp mp pp

227 **G** B^b-2,6 E^b-3 E^b-2

(pp)

236

246 B^b-2,6 E^b-2

254 B^b-2,6

pp

262 E^b-3

269 E^b-2 B^b-2,6

276 **1** E^b-2 $B^b-2,6$ E^b-3

pp cresc.

285 E^b-2 B^b-C $E+c3,c5$ B^b+E^b $E+c3$ $B-5$ **H** \downarrow 10

mp *ff*

292 $E+c3,c5$ $B-5$ $E+c3$ B^b+c3 $B-5+c3$ $C-5+C3$

p *f*

sing:gliss:up

sing

sing

sing $E+c3$ $C-5+C3$

297 B^b-C B^b+E^b $B^b-5,6$ B^b-C $E+c3$ B^b+E^b $B-5+c3$

f *ff* *mp*

301 B^b-6 B^b-C $B^b-5,6$ B^b+E^b $E+c3$ B^b-C B^b+E^b $E+c3$ $B-5+c3$ E^b-2 E^b-3 $B^b-2,6$

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

sing

sing

sing:gliss:up

$B^b-2,6$

306 $B-5+c3$ B^b+c3 $E+c3$ B^b+c3 $B-5+c3$ $C-5+C3$

p *mf*

312 $E+c3$ $B-5+c3$ $E+c3$ $B-5+c3$ B^b-6 **1**

p *mf* *f*

317 *p* *f* *fp < f*

B-5 E+c3 sing B^b-6 E+c3 B-5+c3 C-5+C3 B-5 B^b-6 B^b-5,6 sing C-4

slower ♩ = 134

321 *p*

11 B-5+c3 E+c3 C-5+C3 B^b+c3 sing E+c3, c5 B^b+c3 E+c3 B^b+c3 C-5+C3

7:6 5 3

326 *mp* *p*

slower ♩ = 126

E+c3, c5 B^b-C E+c3, c5 sing: gliss: up B-5+c3 E+c3

Tempo I

faster ♩ = 134

332 *mp* *mf* *pp* *pp* *mp*

faster ♩ = 134 slower ♩ = 126 faster ♩ = 134

B^b-5,6 B-5+c3 E+c3 C-5+C3 B^b+c3 B^b+E^b B^b-C C-5+C3 E+c3

7:6 5 7:6 3 3

Tempo I sing: gliss: up

337 *p* *f* *p* *f*

slower ♩ = 96 faster ♩ = 134

13 C-5 E+c3, c5 B-5+c3 E+c3 B-5+c3

5 5

344 *p* *f* *pp*

faster; very smooth ♩ = 136

14 slower ♩ = 96

B^b-6 B-5+c3 I B-5+c3 E+c3 C-5+C3 B^b+c3 1

7:6

349 $B-5+c3$ $C-5+C3$
 $E+c3$ B^b+c3
 $E+c3$ $B-5+c3$ $C-5+C3$
 B^b+c3

353 $E+c3$ $C-5+C3$
 $B-5+c3$ B^b+c3

358 $B-5+c3$ B^b+c3
 $E+c3$ $C-5+C3$
cresc. poco a poco $E+c3$ $B-5+c3$ $C-5+C3$
 B^b+c3

362 $E+c3$ $C-5+C3$
 B^b+c3

367 $B-5+c3$ B^b+c3
 $E+c3$ $C-5+C3$
 $E+c3$ $B-5+c3$ $C-5+C3$
 B^b+c3

371 $B-5+c3$ B^b+c3
 $E+c3$ $C-5+C3$
 B^b+c3

376 $B-5+c3$ B^b+c3
 $E+c3$ $C-5+C3$
 $E+c3$ $B-5+c3$ $C-5+C3$
 B^b+c3 *(mp)*

381 $E+c3$ $C-5+C3$
 B^b+c3

385 $B-5+c3$ B^b+c3
 $E+c3$ $C-5+C3$
 $E+c3$ $B-5+c3$ $C-5+C3$ B^b+c3
 $B-5+c3$ $E+c3$ $C-5+C3$ B^b+c3 *(mf)*

389 $B-5+c3$ B^b+c3
 $E+c3$ $C-5+C3$
 $E+c3$ $B-5+c3$ $C-5+C3$
 $B-5+c3$ $E+c3$ $C-5+C3$ *mp dim. poco a poco*

394 $B-5+c3$ B^b+c3
 $E+c3$ $C-5+C3$
 $E+c3$ $B-5+c3$ $C-5+C3$
 $B-5+c3$ $E+c3$ $C-5+C3$ *p*

398 $B-5+c3$ B^b+c3
 $E+c3$ $C-5+C3$
 $E+c3$ $B-5+c3$ $C-5+C3$ *pp*

403 $B-5+c3$ B^b+c3
 $E+c3$ $C-5+C3$
 $E+c3$ $B-5+c3$ $C-5+C3$ B^b+c3
 $B-5+c3$ $E+c3$ $C-5+C3$ *pp*

407 $B-5+c3$ B^b+c3
 $E+c3$ $C-5+C3$
 $E+c3$ $B-5+c3$ $C-5+C3$ B^b+c3 *mp*

412 $B-5+c3$ B^b+c3
 $E+c3$ $C-5+C3$
 $E+c3$ $B-5+c3$ $C-5+C3$ B^b+c3
 $B-5+c3$ $E+c3$ $C-5+C3$ *p* *pp*

417 $B-5+c3$ B^b+c3
 $E+c3$

421 $B-5+c3$ B^b+c3
 $E+c3$ $C-5+C3$
 L'istesso tempo
 $E+c3$ B^b-C $E+c3,c5$ B^b+E^b
 B^b+E^b $E+c3$
 (pp)

426 $E+c3$ B^b+c3
 $B-5+c3$ $C-5+C3$
 $E+c3$
 $B-5+c3$ sing:gliss:up
 $mp > pp$

435 B^b-C B^b+E^b sing:gliss:up
 B^b-C B^b+E^b sing:gliss:up
 mf mp pp f p mf

441 slower $\text{♩} = 96$
 $E+c3$ $B-5+c3$ $E+c3$ $C-5$
 $E+c3,c5$ $B-5$ $B^b-5,6$ B^b-C $E+c3,c5$
 $E+c3$ $B^b-5,6$ B^b+E^b $E+c3$
 K

445 $E+c3,c5$ B^b-6 $B-5$ B^b-C $B-5$ $B^b-5,6$ B^b+E^b
 $E+c3$ B^b-6 B^b-C $E+c3,c5$

448 sim:> B^b-C B^b+E^b $B^b-5,6$ $E+c3$ $B^b-5,6$ $E+c3$ $C^{\#}-4$ $B-5$ B^b-6
 $E+c3,c5$ $C-4$ $B-5$ B^b-6

451 $C-5$ $B-5$ $C^{\#}-4$ B^b-C $B^b-5,6$ $C-4$ $E+c3$
 $E+c3,c5$ $B^b-5,6$
 cresc.

454 $E+c3$ B^b-6 $B-5$ B^b-6 $B-5$ $C^{\#}-4$
 $E+c3,c5$ $B^b-5,6$ $B^b-5,6$ $C-5$ B^b-6 $B-5$ $C-4$ B^b+E^b
 trill B
 sfz mf

457 *p* *sfz*

E+c3 B^b+E^b B^b-6 trill -C,E^b
 E+c3,c5 B^b-C C[#]-4 E+c3 B^b-5,6 C-4 B^b-6 B^b+E^b
 B^b-5,6 C[#]-4 B^b-5,6 B^b-C *trm*

461 *p* *sfz* *p* *cresc.* *sfz*

trill c5 B^b-5,6 E+c3 sing
 C-4 C-5 E+c3,c5 C-5 C-4 E+c3,c5 B^b-6 E+c3 sing
 C[#]-4 C-5 *trm* C-4 E+c3,c5 B^b-6 E+c3,c5 *trm*

464 *sfz*

trill -C,E^b B^b+E^b C-4 B-5 C-5 B-5 C-4 B^b-C B^b-5,6
 C[#]-4 C-5 sing *trm* C-5 B-5 C-4 B^b+E^b B^b-5,6

467 *sfz* *p* *sfz* *sfz*

trill C[#] C-4 B-5 B^b-C sing
 sing E+c3,c5 trill 5 E+c3,c5 B^b-5,6 sing B-5 B^b-C sing
 C[#]-4 C-4 E+c3 B^b-6 E+c3 *trm* C-5 B^b+E^b *trm*

470 *cresc.*

C[#]-4 E+c3 B-5 C-4 E+c3
 B-5 C-4 B^b-5,6 E+c3,c5 C-5 C-4 E+c3
 C[#]-4 B^b-5,6 E+c3,c5

474 *sfz* *mf*

B-5 C[#]-4 E+c3,c5 C[#]-4 B^b+E^b B^b-6 trill -C,E^b
 C-5 C-4 B^b-5,6 E+c3 trill C[#] B^b-C B^b-5,6 *trm*

add more and more 'sing' to L

477

p

B^b-5,6 C[#]-4 E+c3 C[#]-4 E+c3 E^b-2 B-5 C-5 C[#]-4

480

cresc.

E^b-3 B-5 C-5 E^b-2 B^b+E^b C[#]-4 B^b+E^b E^b-3 E^b-2 B^b-5,6 B^b-6 C-4 B^b-5,6

sfz

trill E^b E^b-3 sing *tr*

484

trill B sing B-5 C[#]-4 E^b-2 B^b+E^b trill C[#] sing E^b-2 trill 6 sing:gliss:up

sfz f sfz sfz p f

L

488

trill -C,E^b B^b+E^b G[#]+c1 B^b-2,6 E^b-2

sfz p

16

trill E^b E^b-3

wait c. 3 seconds after sound file has completely died

faster ♩ = 160

17

493

f

B^b-5,6 G[#]+c1

3 2

wait at least 5 seconds after sound file has completely died

501

f

E^b-3 sing E^b-2 B^b-2,6

M slower, mechanical ♩ = 92

18 E+c3,c5
B-5+c3

509

p

faster ♩ = 126
almost no sound from here until Q (almost miming)

E+c3
E+c3,c5

515

ppp

E+c3,c5
E+c3 C-5+C3

520

wait until sound file dies then proceed without a break

19

p *pp* *pp* *mp*

L'istesso tempo

accel.....

O C#4 trill B
trill C# B-5
trill -C,E^b trill C#
B^b+E^b C-4
trill -C,E^b trill C#
B^b+E^b E^b-3
trill C# C-4

524

p sempre

trill 6
E^b-3,6
trill 6
E^b-3
trill G#
G#+c1
trill 6
E^b-3

533

p

P Tempo I

20 B^b-C
B^b+E^b very long break, until it feels like the piece is over

E+c3,c5 B^b-C B^b+E^b

539

p

21

Q

545

sing:gliss:up

sing:gliss:up

sing:gliss:up

ff

549

sing:gliss:up

C#-4 E^b-2

E+c3, c5

B^b+E^b

E+c3 trill c5 B^b-C

sing

sing:gliss:up

ff

mf

ff

