

How the scales are constructed and listed:

tetrachords | steps: w = whole, h = half, +2 = augmented second/minor third

- 1 | wwh
- 2 | whw
- 3 | hww
- 4 | www
- 5 | hwh
- 6 | whh
- 7 | hhw
- 8 | +2hh
- 9 | h+2h
- 10 | hh+2
- 11 | w+2h
- 12 | +2hw
- 13 | wh+2
- 14 | +2wh
- 15 | hw+2
- 16 | h+2w
- 17 | +2ww
- 18 | ww+2
- 19 | w+2w

Scales are listed by tetrachord number + [intermediary interval] + tetrachord number. For example, a major scale is 1w1: wwh+w+wwh. Then, I give an example of the scale with C as its tonic. Sometimes an intermediary interval to connect the tetrachords isn't necessary and the two are simply put together, as in group 4, 4|4: www+www. Groups that have less than 19 permutations are that way because some combinations do not repeat at the octave. Theoretically, you can connect tetrachords however you wish, and you may want to explore those patterns and sounds, too. I spelled the scales as stepwise as possible, but if you don't like the accidentals I chose, feel free to change them. Enjoy!

Patterns

These are some patterns I came up with, based around things I had seen in (tonal) music and other ideas I came up with. They are indicated by scale degree number and the first two or three permutations. For example, 1231 2342 in C major would be CDEC DEFD EFGE FGAF and so on, up and down. Feel free to add your own and tell me about them (or not). The boxes indicate groups, if you wanted to, say, do one group one day (or week or month) and then change it up. These patterns will also work with octatonic (hwhwhwhw/whwhwhwh) and chromatic scales.

group i

1	normal	= stepwise up and down
2	loop	= 12 1232 123432 12345432 etc.
3	thirds	= 13243546 etc.
4	fourths	= 142536 etc.
5	fifths	= 152637 etc.
6	sixths	= 162839 etc.
7	sevenths	= 172839 etc.
8	octaves	
9	pedal	= 1213141516 etc.

group ii

10	121,232,343
11	1231,2342
12	135,246,357
13	1353,2464
14	143,254,365
15	1357,2468
16	153,264,375
17	1543,2654
18	163,274,385
19	1643,2754
20	173,284,395
21	1765,2876

group iii

	apost. means + 1 octave
22	878,212,323
23	1213,2324
24	531,642,753
25	1235,2346
26	146,257,368
27	1432,2543
28	159,263',374'
29	1523,2634
30	164,275,386
31	1623,2734
32	175,286,397
33	1723,2834

group iv

34	123,234,345
35	1321,2432
36	134,245,356
37	1246, 2357
38	147,258,369
39	1423,2534
40	531,642,753
41	1545,2656
42	165,276,387
43	1654,2765
44	176,287,398
45	1743,2854

group v

46	1234,2345
47	3213,4324
48	3123,4234
49	1358,2469
50	1346,2457
51	4123,5234
52	1535,2646
53	5135,6246
54	1216,2327
55	6121,7232
56	1753,2864
57	1764,2875

Scales

group 1

tetrachords	steps	C = tonic	common name, if any
1[w]1	wwhwwwh	CDEFGABC	major
1[w]2	wwhwwhw	CDEFGABbC	mixolydian
1[w]3	wwhwhww	CDEFGAbBbC	
1[h]4	wwhhwww	CDEFGbAbBbC	"arabian"
1[+2]5	wwh+2hwh	CDEFG#ABC	
1[+2]6	wwh+2whh	CDEFG#A#BC	
1[+2]7	wwh+2hhw	CDEFG#ABbC	
1[w]8	wwhw+2hh	CDEFGA#BC	
1[w]9	wwhwh+2h	CDEFGAbBC	
1[w]10	wwhwhh+2	CDEFGAbBbbC	
1[h]11	wwhhw+2h	CDEFGbAbBC	
1[h]12	wwhh+2hw	CDEFGbABbC	
1[h]13	wwhhwh+2	CDEFGbAbBbbC	
1[h]14	wwhh+2wh	CDEFGbABC	
1[h]15	wwhhhw+2	CDEFF#GAC	
1[h]16	wwhhh+2w	CDEFF#GBbC	
1 17	wwh+2ww	CDEFAbBbC	
1 18	wwhww+2	CDEFGAC	
1 19	wwhw+2w	CDEFGBbC	

(italicized scales do not have a perfect fifth from the first scale degree, making it difficult to make them sound 'normal')

group 2

tetrachords	steps	C = tonic	common name, if any
2[w]1	whwwwwh	CDEbFGABC	melodic minor
2[w]2	whwwwhw	CDEbFGABbC	dorian
2[w]3	whwhhww	CDEbFGAbBbC	aeolian (natural minor)
2[h]4	whwhwww	CDEbFGbAbBbC	
2[+2]5	whw+2hwh	CDEbFG#ABC	
2[+2]6	whw+2whh	CDEbFG#A#BC	
2[+2]7	whw+2hhw	CDEbFG#ABbC	
2[w]8	whww+2hh	CDEbFGA#BC	
2[w]9	whwhh+2h	CDEbFGAbBC	harmonic minor
2[w]10	whwwhh+2	CDEbFGAbBbbC	
2[h]11	whwhw+2h	CDEbFGbAbBC	
2[h]12	whwh+2hw	CDEbFGbABbC	
2[h]13	whwhwh+2	CDEbFGbAbBbbC	
2[h]14	whwh+2wh	CDEbFGbABC	
2[h]15	whwhhw+2	CDEbFF#GAC	
2[h]16	whwhh+2w	CDEbFF#GBbC	blues
2 17	whw+2ww	CDEbFAbBbC	
2 18	whwww+2	CDEbFGAC	
2 19	whww+2w	CDEbFGBbC	

Scales

group 3

tetrachords	steps	C = tonic	common name, if any
3[w]1	hwwwwwh	CDbEbFGABC	
3[w]2	hwwwwwh	CDbEbFGABbC	
3[w]3	hwwwhww	CDbEbFGAbBbC	phrygian
3[h]4	hwwhwww	CDbEbFGbAbBbC	locrian
3[+2]5	hww+2hwh	CDbEbFG#ABC	
3[+2]6	hww+2whh	CDbEbFG#A#BC	
3[+2]7	hww+2hhw	CDbEbFG#ABbC	
3[w]8	hwww+2hh	CDbEbFGA#BC	
3[w]9	hwwwh+2h	CDbEbFGAbBC	
3[w]10	hwwwhh+2	CDbEbFGAbBbbC	
3[h]11	hwwhw+2h	CDbEbFGbAbBC	
3[h]12	hwwh+2hw	CDbEbFGbABbC	
3[h]13	hwwhwh+2	CDbEbFGbAbBbbC	
3[h]14	hwwh+2wh	CDbEbFGbABC	
3[h]15	hwwhhw+2	CDbEbFF#GAC	
3[h]16	hwwhh+2w	CDbEbFF#GBbC	
3 17	hww+2ww	CDbEbFAbBbC	
3 18	hwwww+2	CDbEbFGAC	
3 19	hwww+2w	CDbEbFGBbC	

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group 4

tetrachords	steps	C = tonic	common name, if any
4[h]1	wwwhwwh	CDEF#GABC	lydian
4[h]2	wwwhwhw	CDEF#GABbC	"lydian dominant"
4[h]3	wwwhhww	CDEF#GAbBbC	
4 4	wwwww	CDEF#G#A#C	whole tone
4[w]5	wwwwhwh	CDEF#G#ABC	
4[w]6	wwwwwhh	CDEF#G#A#BC	
4[w]7	wwwwhhw	CDEF#G#ABbC	
4[h]8	wwwh+2hh	CDEF#GA#BC	
4[h]9	wwwhh+2h	CDEF#GAbBC	
4[h]10	wwwhhh+2	CDEF#GAbBbbC	
4 11	wwww+2h	CDEF#G#BC	
4 12	www+2hw	CDEF#ABbC	
4 13	wwwwh+2	CDEF#G#AC	
4 14	www+2wh	CDEF#ABC	
4 15	wwwhw+2	CDEF#GAC	
4 16	wwwh+2w	CDEF#GBbC	

Scales

group 5

tetrachords	steps	C = tonic	common name, if any
5[+2]1	hwh+2wwh	CD ^b E ^b F ^b GABC	
5[+2]2	hwh+2whw	CD ^b E ^b F ^b GAB ^b C	
5[+2]3	hwh+2hww	CD ^b E ^b F ^b GAbB ^b C	
5[w]4	hwhwww	CD ^b E ^b F ^b G ^b AbB ^b C	
5[M3]5	hwhM3hwh	CD ^b E ^b F ^b G#ABC	
5[M3]6	hwhM3whh	CD ^b E ^b F ^b G#A#BC	
5[M3]7	hwhM3hhw	CD ^b E ^b F ^b G#AB ^b C	
5[+2]8	hwh+2+2hh	CD ^b E ^b F ^b GA#BC	
5[+2]9	hwh+2h+2h	CD ^b E ^b F ^b GAbBC	
5[+2]10	hwh+2hh+2	CD ^b E ^b F ^b GAbB ^b bC	
5[w]11	hwhww+2h	CD ^b E ^b F ^b G ^b AbBC	
5[w]12	hwhw+2hw	CD ^b E ^b F ^b G ^b AB ^b C	
5[w]13	hwhwhw+2	CD ^b E ^b F ^b G ^b AbB ^b bC	
5[w]14	hwhw+2wh	CD ^b E ^b F ^b G ^b ABC	
5[w]15	hwhwhw+2	CD ^b E ^b F ^b G ^b GAC	
5[w]16	hwhwh+2w	CD ^b E ^b F ^b G ^b GB ^b C	
5[h]17	hw ^h h+2ww	CD ^b E ^b F ^b FA ^b B ^b C	
5[h]18	hw ^h hw+2	CD ^b E ^b F ^b FGAC	
5[h]19	hw ^h hw+2w	CD ^b E ^b F ^b FGB ^b C	

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group 6

tetrachords	steps	C = tonic	common name, if any
6[+2]1	whh+2wwh	CDE ^b F ^b GABC	
6[+2]2	whh+2whw	CDE ^b F ^b GAB ^b C	
6[+2]3	whh+2hww	CDE ^b F ^b GAbB ^b C	
6[w]4	whhwww	CDE ^b F ^b G ^b AbB ^b C	
6[M3]5	whhM3hwh	CDE ^b F ^b G#ABC	
6[M3]6	whhM3whh	CDE ^b F ^b G#A#BC	
6[M3]7	whhM3hhw	CDE ^b F ^b G#AB ^b C	
6[+2]8	whh+2+2hh	CDE ^b F ^b GA#BC	
6[+2]9	whh+2h+2h	CDE ^b F ^b GAbBC	
6[+2]10	whh+2hh+2	CDE ^b F ^b GAbB ^b bC	
6[w]11	whhww+2h	CDE ^b F ^b G ^b AbBC	
6[w]12	whhw+2hw	CDE ^b F ^b G ^b AB ^b C	
6[w]13	whhwhw+2	CDE ^b F ^b G ^b AbB ^b bC	
6[w]14	whhw+2wh	CDE ^b F ^b G ^b ABC	
6[w]15	whhwhw+2	CDE ^b F ^b G ^b GAC	
6[w]16	whhwh+2w	CDE ^b F ^b G ^b GB ^b C	
6[h]17	wh ^h h+2ww	CDE ^b F ^b FA ^b B ^b C	
6[h]18	wh ^h hw+2	CDE ^b F ^b FGAC	
6[h]19	wh ^h hw+2w	CDE ^b F ^b FGB ^b C	

Scales

group 7

tetrachords	steps	C = tonic
7[+2]1	hhw+2wwh	CD ^b DEGABC
7[+2]2	hhw+2whw	CD ^b DEGAB ^b C
7[+2]3	hhw+2hww	CD ^b DEGAbB ^b C
7[w]4	hhwwwww	CD ^b DEG ^b AbB ^b C
7[M3]5	hhwM3hwh	CD ^b DEG#ABC
7[M3]6	hhwM3whh	CD ^b DEG#A#BC
7[M3]7	hhwM3hhw	CD ^b DEG#AB ^b C
7[+2]8	hhw+2+2hh	CD ^b DEGA#BC
7[+2]9	hhw+2h+2h	CD ^b DEGAbBC
7[+2]10	hhw+2hh+2	CD ^b DEGAbB ^b bC
7[w]11	hhwww+2h	CD ^b DEG ^b AbBC
7[w]12	hhww+2hw	CD ^b DEG ^b AB ^b C
7[w]13	hhwwwh+2	CD ^b DEG ^b AbB ^b bC
7[w]14	hhww+2wh	CD ^b DEG ^b ABC
7[w]15	hhwwhw+2	CD ^b DEG ^b GAC
7[w]16	hhwwh+2w	CD ^b DEG ^b GB ^b C
7[h]17	hhwh+2ww	CD ^b DEFAbB ^b C
7[h]18	hhwhww+2	CD ^b DEFGAC
7[h]19	hhwhw+2w	CD ^b DEFGB ^b C

common name, if any

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group 8

tetrachords	steps	C = tonic
8[w]1	+2hhwwwh	CD#EFGABC
8[w]2	+2hhwwhw	CD#EFGAB ^b C
8[w]3	+2hhwhww	CD#EFGAbB ^b C
8[h]4	+2hhhwww	CD#EFG ^b AbB ^b C
8[+2]5	+2hh+2hwh	CD#EFG#ABC
8[+2]6	+2hh+2whh	CD#EFG#A#BC
8[+2]7	+2hh+2hhw	CD#EFG#AB ^b C
8[w]8	+2hhw+2hh	CD#EFGA#BC
8[w]9	+2hhwh+2h	CD#EFGAbBC
8[w]10	+2hhwhh+2	CD#EFGAbB ^b bC
8[h]11	+2hhh+2h	CD#EFG ^b AbBC
8[h]12	+2hhh+2hw	CD#EFG ^b AB ^b C
8[h]13	+2hhhwh+2	CD#EFG ^b AbB ^b bC
8[h]14	+2hhh+2wh	CD#EFG ^b ABC
8[h]15	+2hhhhw+2	CD#EFF#GAC
8[h]16	+2hhhh+2w	CD#EFF#GB ^b C
8 17	+2hh+2ww	CD#EFAbB ^b C
8 18	+2hhww+2	CD#EFGAC
8 19	+2hhw+2w	CD#EFGB ^b C

common name, if any

"byzantine" "gypsy minor"

Scales

group 9

tetrachords	steps	C = tonic	common name, if any
9[w]1	h+2hwwwh	CDbEFGABC	
9[w]2	h+2hwwhw	CDbEFGABbC	
9[w]3	h+2hwhww	CDbEFGAbBbC	
9[h]4	h+2hhwww	CDbEFGbAbBbC	dim. whole
9[+2]5	h+2h+2hwh	CDbEFG#ABC	
9[+2]6	h+2h+2whh	CDbEFG#A#BC	
9[+2]7	h+2h+2hhw	CDbEFG#ABbC	
9[w]8	h+2hw+2hh	CDbEFGA#BC	
9[w]9	h+2hwh+2h	CDbEFGAbBC	
9[w]10	h+2hwhh+2	CDbEFGAbBbbC	
9[h]11	h+2hhw+2h	CDbEFGbAbBC	
9[h]12	h+2hh+2hw	CDbEFGbABbC	
9[h]13	h+2hhwh+2	CDbEFGbAbBbbC	
9[h]14	h+2hh+2wh	CDbEFGbABC	
9[h]15	h+2hhh+2	CDbEFF#GAC	
9[h]16	h+2hhh+2w	CDbEFF#GBbC	
9 17	h+2h+2ww	CDbEFAbBbC	
9 18	h+2hww+2	CDbEFGAC	
9 19	h+2hw+2w	CDbEFGBbC	

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group 10

tetrachords	steps	C = tonic	common name, if any
10[w]1	hh+2wwwh	CDbDFGABC	
10[w]2	hh+2wwhw	CDbDFGABbC	
10[w]3	hh+2whww	CDbDFGAbBbC	
10[h]4	hh+2hwww	CDbDFGbAbBbC	
10[+2]5	hh+2+2hwh	CDbDFG#ABC	
10[+2]6	hh+2+2whh	CDbDFG#A#BC	
10[+2]7	hh+2+2hhw	CDbDFG#ABbC	
10[w]8	hh+2w+2hh	CDbDFGA#BC	
10[w]9	hh+2wh+2h	CDbDFGAbBC	
10[w]10	hh+2whh+2	CDbDFGAbBbbC	
10[h]11	hh+2hw+2h	CDbDFGbAbBC	
10[h]12	hh+2h+2hw	CDbDFGbABbC	
10[h]13	hh+2hwh+2	CDbDFGbAbBbbC	
10[h]14	hh+2h+2wh	CDbDFGbABC	
10[h]15	hh+2hhw+2	CDbDFF#GAC	
10[h]16	hh+2hh+2w	CDbDFF#GBbC	
10 17	hh+2+2ww	CDbDFAbBbC	
10 18	hh+2ww+2	CDbDFGAC	
10 19	hh+2w+2w	CDbDFGBbC	

Scales

group 11

tetrachords	steps	C = tonic	common name, if any
11[h]1	w+2hhwwh	CDE#F#GABC	
11[h]2	w+2hhwhw	CDE#F#GABbC	
11[h]3	w+2hhhww	CDE#F#GAbBbC	
11 4	w+2hwww	CDE#F#G#A#C	
11[w]5	w+2hwhwh	CDE#F#G#ABC	
11[w]6	w+2hwwhh	CDE#F#G#A#BC	
11[w]7	w+2hwhhw	CDE#F#G#ABbC	
11[h]8	w+2hh+2hh	CDE#F#GA#BC	
11[h]9	w+2hhh+2h	CDE#F#GAbBC	
11[h]10	w+2hhhh+2	CDE#F#GAbBbbC	
11 11	w+2hw+2h	CDE#F#G#BC	
11 12	w+2h+2hw	CDE#F#ABbC	
11 13	w+2hwh+2	CDE#F#G#AC	
11 14	w+2h+2wh	CDE#F#ABC	
11 15	w+2hhw+2	CDE#F#GAC	
11 16	w+2hh+2w	CDE#F#GBbC	

group 12

tetrachords	steps	C = tonic	common name, if any
12[h]1	+2hwhwwh	CD#EF#GABC	
12[h]2	+2hwhwhw	CD#EF#GABbC	
12[h]3	+2hwhhww	CD#EF#GAbBbC	
12 4	+2hwww	CD#EF#G#A#C	
12[w]5	+2hwhwh	CD#EF#G#ABC	
12[w]6	+2hwwwh	CD#EF#G#A#BC	
12[w]7	+2hwwhhw	CD#EF#G#ABbC	
12[h]8	+2hwh+2hh	CD#EF#GA#BC	
12[h]9	+2hwhh+2h	CD#EF#GAbBC	
12[h]10	+2hwhhh+2	CD#EF#GAbBbbC	
12 11	+2hww+2h	CD#EF#G#BC	
12 12	+2hw+2hw	CD#EF#ABbC	
12 13	+2hwh+2	CD#EF#G#AC	
12 14	+2hw+2wh	CD#EF#ABC	
12 15	+2hwhw+2	CD#EF#GAC	
12 16	+2hwh+2w	CD#EF#GBbC	

Scales

group 13

tetrachords	steps	C = tonic	common name, if any
13[h]1	wh+2hwwh	CDEbF#GABC	
13[h]2	wh+2hwhw	CDEbF#GABbC	
13[h]3	wh+2hhww	CDEbF#GAbBbC	
13 4	wh+2www	CDEbF#G#A#C	
13[w]5	wh+2whwh	CDEbF#G#ABC	
13[w]6	wh+2wwhh	CDEbF#G#A#BC	
13[w]7	wh+2whhw	CDEbF#G#ABbC	
13[h]8	wh+2h+2hh	CDEbF#GA#BC	
13[h]9	wh+2hh+2h	CDEbF#GAbBC	
13[h]10	wh+2hhh+2	CDEbF#GAbBbbC	
13 11	wh+2w+2h	CDEbF#G#BC	
13 12	wh+2+2hw	CDEbF#ABbC	
13 13	wh+2wh+2	CDEbF#G#AC	
13 14	wh+2+2wh	CDEbF#ABC	
13 15	wh+2hw+2	CDEbF#GAC	
13 16	wh+2h+2w	CDEbF#GBbC	

group 14

tetrachords	steps	C = tonic	common name, if any
14[h]1	+2whhwwh	CD#E#F#GABC	
14[h]2	+2whhwhw	CD#E#F#GABbC	
14[h]3	+2whhhww	CD#E#F#GAbBbC	
14 4	+2whwww	CD#E#F#G#A#C	
14[w]5	+2whwhwh	CD#E#F#G#ABC	
14[w]6	+2whwwhh	CD#E#F#G#A#BC	
14[w]7	+2whwhhw	CD#E#F#G#ABbC	
14[h]8	+2whh+2hh	CD#E#F#GA#BC	
14[h]9	+2whhh+2h	CD#E#F#GAbBC	
14[h]10	+2whhhh+2	CD#E#F#GAbBbbC	
14 11	+2whw+2h	CD#E#F#G#BC	
14 12	+2wh+2hw	CD#E#F#ABbC	
14 13	+2whwh+2	CD#E#F#G#AC	
14 14	+2wh+2wh	CD#E#F#ABC	
14 15	+2whhw+2	CD#E#F#GAC	
14 16	+2whh+2w	CD#E#F#GBbC	

Scales

group 15

tetrachords	steps	C = tonic	common name, if any
15[h]1	hw+2hwwh	CDbEbF#GABC	
15[h]2	hw+2hwwh	CDbEbF#GABbC	
15[h]3	hw+2hhww	CDbEbF#GAbBbC	
15 4	hw+2www	CDbEbF#G#A#C	
15[w]5	hw+2whwh	CDbEbF#G#ABC	
15[w]6	hw+2wwhh	CDbEbF#G#A#BC	
15[w]7	hw+2whhw	CDbEbF#G#ABbC	
15[h]8	hw+2h+2hh	CDbEbF#GA#BC	
15[h]9	hw+2hh+2h	CDbEbF#GAbBC	
15[h]10	hw+2hhh+2	CDbEbF#GAbBbbC	
15 11	hw+2w+2h	CDbEbF#G#BC	
15 12	hw+2+2hw	CDbEbF#ABbC	
15 13	hw+2wh+2	CDbEbF#G#AC	
15 14	hw+2+2wh	CDbEbF#ABC	
15 15	hw+2hw+2	CDbEbF#GAC	
15 16	hw+2h+2w	CDbEbF#GBbC	

group 16

tetrachords	steps	C = tonic	common name, if any
16[h]1	h+2whwwh	CDbEF#GABC	
16[h]2	h+2whwhw	CDbEF#GABbC	
16[h]3	h+2whhww	CDbEF#GAbBbC	
16 4	h+2www	CDbEF#G#A#C	
16[w]5	h+2wwwhw	CDbEF#G#ABC	
16[w]6	h+2wwwhh	CDbEF#G#A#BC	
16[w]7	h+2wwhhw	CDbEF#G#ABbC	
16[h]8	h+2wh+2hh	CDbEF#GA#BC	
16[h]9	h+2whh+2h	CDbEF#GAbBC	
16[h]10	h+2whhh+2	CDbEF#GAbBbbC	
16 11	h+2ww+2h	CDbEF#G#BC	
16 12	h+2w+2hw	CDbEF#ABbC	
16 13	h+2wwh+2	CDbEF#G#AC	
16 14	h+2w+2wh	CDbEF#ABC	
16 15	h+2whw+2	CDbEF#GAC	
16 16	h+2wh+2w	CDbEF#GBbC	

Scales

group 17

tetrachords	steps	C = tonic	common name, if any
17 1	+2wwwwh	CEbFGABC	
17 2	+2wwwhw	CEbFGABbC	
17 3	+2wwhww	CEbFGAbBbC	
17h5	+2wwhwh	CEbFGAbABC	
17h6	+2wwhwhh	CEbFGAbBbBC	
17h7	+2wwhwhw	CEbFGAbABbC	
17 8	+2ww+2hh	CEbFGA#BC	
17 9	+2wwh+2h	CEbFGAbBC	
17 10	+2wwhh+2	CEbFGAbAC	

group 18

tetrachords	steps	C = tonic	common name, if any
18 1	ww+2wwh	CDEGABC	
18 2	ww+2whw	CDEGABbC	
18 3	ww+2hww	CDEGAbBbC	
18h5	ww+2hhwh	CDEGAbABC	
18h6	ww+2hwhh	CDEGAbBbBC	
18h7	ww+2hhwh	CDEGAbABbC	
18 8	ww+2+2hh	CDEGA#BC	
18 9	ww+2h+2h	CDEGAbBC	
18 10	ww+2hh+2	CDEGAbAC	

group 19

tetrachords	steps	C = tonic	common name, if any
19 1	w+2wwwh	CDFGABC	
19 2	w+2wwhw	CDFGABbC	
19 3	w+2whww	CDFGAbBbC	
19h5	w+2whhwh	CDFGAbABC	
19h6	w+2whwhh	CDFGAbBbBC	
19h7	w+2whhwh	CDFGAbABbC	
19 8	w+2w+2hh	CDFGA#BC	
19 9	w+2wh+2h	CDFGAbBC	
19 10	w+2whh+2	CDFGAbAC	

other scales

5wh2	hwhwhwhw	CDbEbEF#GABbC	octatonic
2hw5	hwhwhwhw	CDEbFGbAbABC	octatonic
	+2h+2h+2h	CEbEGAbBC	augmented