

Harmony of the spheres

Universal musical key

(The golden ratio and the Science of harmonics)



1st part: Introduction

If you love music, take a few minutes of your time and read attentively what is following and discover one of the greatest inventions based on a new musical perception. Everything started when the inventor associate together the diatonic scale and the chromatic scale by using numbers to indicate each degree (see Fig.1). By looking at the numbers that correspond to the intervals that constitute a Perfect Major Chord, you can see appear the legendary Fibonacci sequence (the golden section - PHI - or the divine proportion). With the discovery of a “Musical Universal Key”, M. Sylvain Lalonde, the inventor, demonstrates where this revolutionary easy approach method begin.

With the research of the harmony



The golden section influences the Western vision of the harmony
The sequence of Fibonacci... 1-1-2-3-5-8-13... applies to this rule

Ex: Perfect Majeur Chords: C,E,G,C

Tonic	Tone		Second	Tone		Third	Semitone	Tone		Fourth	Tone		Fifth	Tone		Sixth	Tone		Seventh	Semitone		Octave
	1	2		3	4		5	6	7		8	9		10	11		12	13				
1	C [#]	D ^b	2	D [#]	E ^b	3	E	F	F [#]	G ^b	4	G	G [#]	A ^b	5	A	A [#]	B ^b	6	B	7	C
C			D			E		F			G		G [#]		A		A [#]		B		C	
1	2	3	4	5	6	7	8	9	10	11	12	13										
Semitone		Semitone		Semitone		Semitone		Semitone		Semitone		Semitone		Semitone		Semitone		Semitone		Semitone		
A													B									

When $(A + B) / A = A / B$. The A / B ratio is then equal to the golden ratio.

$$8 / 5 = 1.6$$

Uclide d'Alexandrie

* For more details on natural harmonics see fig.6 & 7 section R&D
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2nd part: Diatonic scale vs Chromatic scale

12 Sounds = 12 Tones = 12 Tonalties

Let's look at the same graphics on a 360-degree platform.. The use of black and white is used to represent the notes of a piano, to help understand this new perception.

Select and print Fig. 3 (picture) cut the two discs, then cut down the 7 windows that correspond to the intervals on disc 1 (Item 32). Overlap disc 1 over the second disc (Item 30) and then position the 1st degree (“Tonic”) on C, you’ll get the “C-D-E-F-G-A-B” sequence.

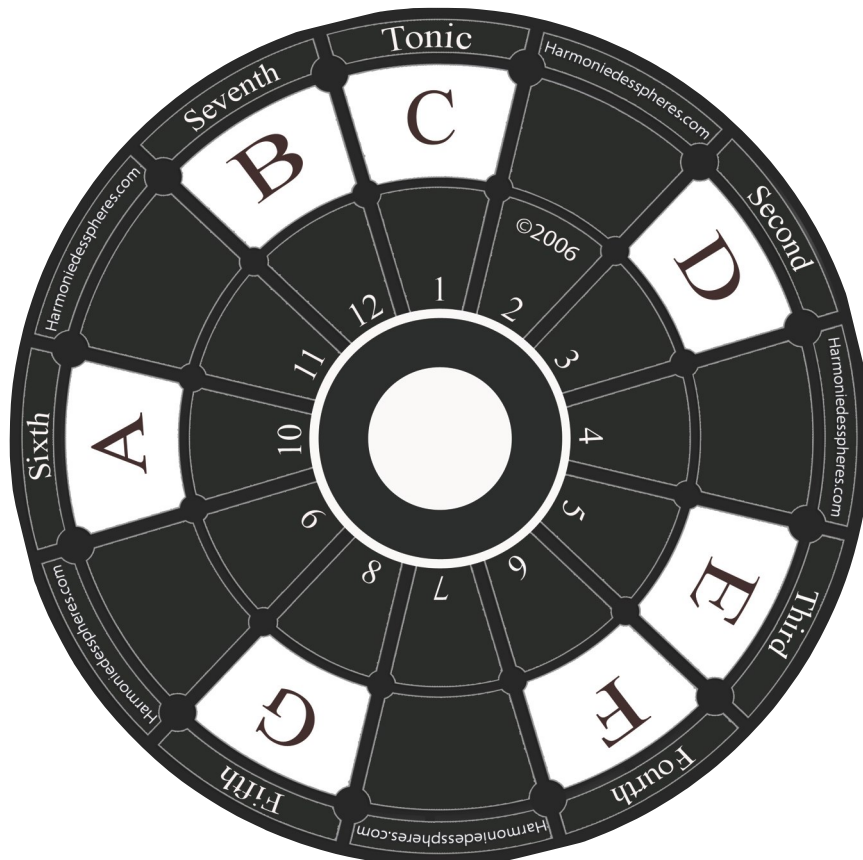
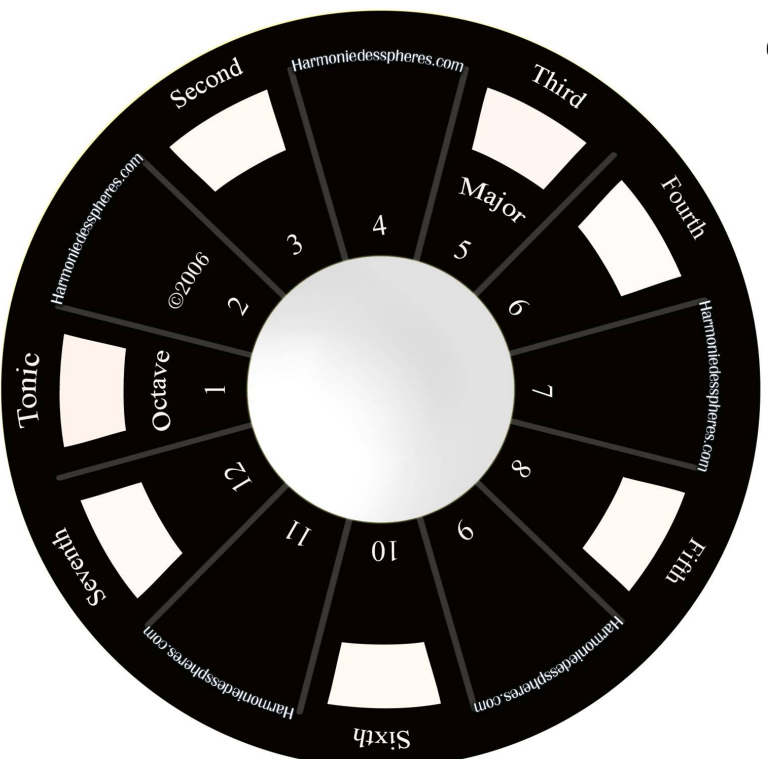


Fig.3



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Now move the “Tonic” on the “Fifth”, the G, this way you obtain the alterations that constitutes the key frame of our tonal system and so on.
We call this:

« The Cycle of Fifths »

Ascending = Sharp order = F, C, G, D, A, E, B

Descending = Flat order = B, E, A, D, G, C, F

Fig.3B

Note that the order of flats is the opposite of sharps

order of #		F	C	G	D	A	E	B	order of b	
order of #		F#	C#	G#	D#	A#	E#	B#	order of b	
order of #		F#	C#	G#	D#	A#	E	B	order of b	
order of #		F#	C#	G#	D#	A	E	B	order of b	
order of #		F#	C#	G#	D	A	E	B	order of b	
order of #		F#	C#	G	D	A	E	B	order of b	
order of #		F#	C	G	D	A	E	B	order of b	
order of #		F	C	G	D	A	E	B	order of b	
order of #		F	C	G	D	A	E ^b	B ^b	order of b	
order of #		F	C	G	D	A ^b	E ^b	B ^b	order of b	
order of #		F	C	G	D ^b	A ^b	E ^b	B ^b	order of b	
order of #		F	C	G ^b	D ^b	A ^b	E ^b	B ^b	order of b	
order of #		F	C ^b	G ^b	D ^b	A ^b	E ^b	B ^b	order of b	
order of #		F ^b	C ^b	G ^b	D ^b	A ^b	E ^b	B ^b	order of b	

Major Range

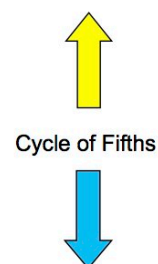
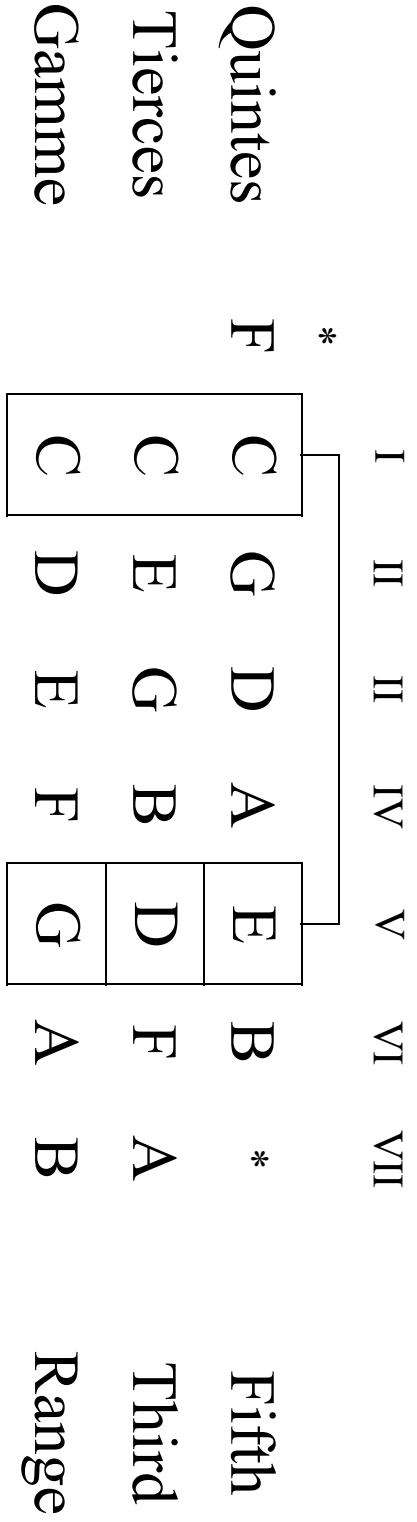


Fig.3d

Cycles des quintes

Cycles of fifths



* Selon l'ordre des dièses / orders of sharps

3rd part: the natural harmonics vs temperate

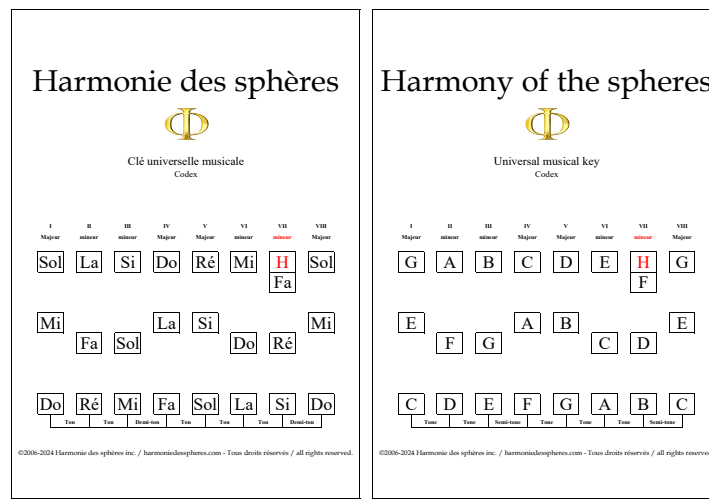
Each note is made of natural multiples called harmonics

At each degree of the scale, there is a three fundamental sound chord

The chords of three sounds consists of a fundamental
a third party (major or minor) and a fifth just.

« THE THIRD CYCLE »

« C, E, G, B, D, F, A »



The notes of a chord can be duplicated at the octave or arpeggiated without
altering the identity of the chord.

You can select and print Fig.3c (Codex) in legal format.

Cut the two parts (A and B) according to the language you want.

Also cut the twenty-four (24) windows (Part A) that correspond to the

« Music intervals »

I degree	C, E, G
II degree	D, F, A
III degree	E, G, B
IV degree	F, A, C
V degree	G, B, D
VI degree	A, C, E
VII degree	B, D, F
VIII degree	C, E, G

Then superimpose part A on part B and position the 1st degree on the C, you will obtain at each degree the notes of all the chords.

You can change the tone as you wish,

The results will be the same.

P.S. You can also use an ABS tube with a diameter of
1.5 inch or 3.81 cm to make it circular shape.

Fig.3c (Codex)

P
A
R
T
I
E

A

Harmonie des sphères



Clé universelle musicale
Codex

I
Majeur

II
mineur

III
mineur

IV
Majeur

V
Majeur

VI
mineur

VII
mineur

VIII
Majeur

Sol

La

Si

Do

Ré

Mi

H

Sol

Mi

La

Si

Do

Ré

Mi

Fa

Sol

Do

Ré

Mi

Fa

Sol

La

Si

Do

Ton

Ton

Demi-ton

Ton

Ton

Ton

Ton

Demi-ton

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Harmony of the spheres



Universal musical key
Codex

I
Majeur

II
mineur

III
mineur

IV
Majeur

V
Majeur

VI
mineur

VII
mineur

VIII
Majeur

G

A

B

C

D

E

H

G

E

A

B

C

D

E

F

G

C

D

E

F

G

A

B

C

Tone

Tone

Semi-tone

Tone

Tone

Tone

Tone

Semi-tone

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P
A
R
T

A

P
A
R
T
I
E

B

Do	Ré	Mi	Fa	Sol	La	Si	Do
Si	Ré ^b	Mi ^b	Fa ^b	Sol ^b	La ^b	Si ^b	Do ^b
S ^b	D ^b	R ^b	F ^b	S ^b	L ^b	S ^b	D ^b
L ^a	D ^a	R ^a	F ^a	S ^a	L ^a	S ^a	D ^a
La	Si	Do	Ré	Mi	Sol	La	Si
L ^a	S ^b	R ^b	D ^b	M ^b	S ^b	L ^b	S ^b
Sol	La	Si	Do	Ré	Fa	Sol	La
S ^a	L ^a	S ^b	D ^a	R ^b	F ^a	S ^a	L ^a
Fa	Sol	La	Si	Do	Ré	Mi	Fa
S ^a	L ^a	S ^b	D ^a	R ^b	F ^a	S ^a	L ^a
Mi	Fa	Sol	La	Si	Do	Ré	Mi
M ⁱ	S ^a	L ^a	S ^b	D ^a	R ^b	F ^a	M ⁱ
Ré	Mi	Sol	Fa	La	Si	Do	Ré
R ^e	M ⁱ	S ^a	F ^a	L ^a	S ^b	D ^a	R ^e
Do	Ré	Mi	Fa	Sol	La	Si	Do
S ^a	R ^e	M ⁱ	S ^a	L ^a	S ^b	D ^a	S ^a
Si	Do	Ré	Mi	Fa	Sol	La	Si
S ^b	D ^a	R ^e	M ⁱ	S ^a	L ^a	S ^b	D ^a
La	Si	Do	Ré	Mi	Sol	La	La
L ^a	S ^b	R ^b	D ^a	M ^b	S ^b	L ^b	L ^a
Sol	La	Si	Do	Ré	Fa	Sol	Sol
S ^a	L ^a	S ^b	D ^a	R ^b	F ^a	S ^a	L ^a
Fa	Sol	La	Si	Do	Ré	Mi	Fa
S ^a	L ^a	S ^b	D ^a	R ^b	F ^a	S ^a	L ^a
Mi	Fa	Sol	La	Si	Do	Ré	Mi
M ⁱ	S ^a	L ^a	S ^b	D ^a	R ^b	F ^a	M ⁱ
Ré	Mi	Sol	Fa	La	Si	Do	Ré
R ^e	M ⁱ	S ^a	F ^a	L ^a	S ^b	D ^a	R ^e
Do	Ré	Mi	Fa	Sol	La	Si	Do

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C	D	E	F	G	A	B	C
B ^b	D ^b	E ^b	F ^b	G ^b	A ^b	B ^b	B ^b
A ^b	C ^b	D ^b	E ^b	F ^b	G ^b	A ^b	A ^b
A ^b	B ^b	C ^b	D ^b	E ^b	F ^b	G ^b	A ^b
G ^b	A ^b	B ^b	C ^b	D ^b	E ^b	F ^b	G ^b
F ^b	G ^b	A ^b	B ^b	C ^b	D ^b	E ^b	F ^b
E ^b	F ^b	G ^b	A ^b	B ^b	C ^b	D ^b	E ^b
D ^b	E ^b	F ^b	G ^b	A ^b	B ^b	C ^b	D ^b
C ^b	D ^b	E ^b	F ^b	G ^b	A ^b	B ^b	C ^b
B ^b	C ^b	D ^b	E ^b	F ^b	G ^b	A ^b	B ^b
A ^b	B ^b	C ^b	D ^b	E ^b	F ^b	G ^b	A ^b
G ^b	A ^b	B ^b	C ^b	D ^b	E ^b	F ^b	G ^b
F ^b	G ^b	A ^b	B ^b	C ^b	D ^b	E ^b	F ^b
E ^b	F ^b	G ^b	A ^b	B ^b	C ^b	D ^b	E ^b
D ^b	E ^b	F ^b	G ^b	A ^b	B ^b	C ^b	D ^b
C ^b	D ^b	E ^b	F ^b	G ^b	A ^b	B ^b	C ^b

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P
A
R
T

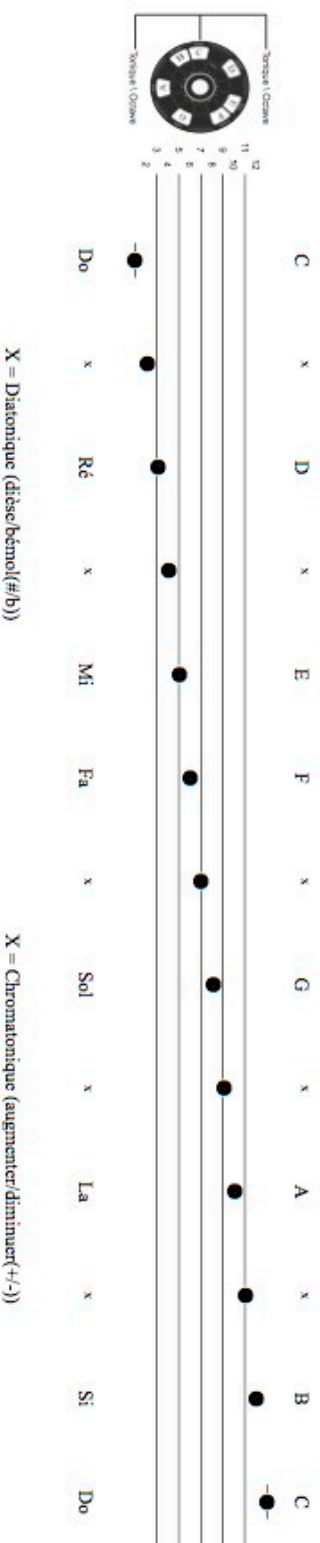
B

Harmony of the spheres



Fig. 4

**Musical universal key
Musical Instrument Digital Interface**



Select and print at legal format the Fig.4b (image) then cut the two rulers along the lines shown and also cut the eight (8) windows that correspond to the intervals of music.

Then superimpose the part of the center on the top of the rule that suits you and position the 1st degree (Tonic) on the C, you will obtain the sequence

“ C-D-E-F-G-A-B-C ”

You can repeat the exercise in fig.3
or simply move the ruler by tone or semitone.

What is important here is that no matter the tone (tonal height) in which you play, the intervals will always be the same :

Major (which constitute the key frame of our tonal system) or minor.



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Cut

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To fold

C

B

B^b_{A[#]}

A^b_{G[#]}

G^b_{F[#]}

F^b_{D[#]}

E^b_{C[#]}

C

B

B^b_{A[#]}

A^b_{G[#]}

G^b_{F[#]}

F^b_{D[#]}

E^b_{C[#]}

C

To fold

C

B

B^b_{A[#]}

A^b_{G[#]}

G^b_{F[#]}

F^b_{D[#]}

E^b_{C[#]}

C

B

B^b_{A[#]}

A^b_{G[#]}

G^b_{F[#]}

F^b_{D[#]}

E^b_{C[#]}

C

Use a plastic ruler as a support print the sheet in legal size

Cut

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Clé universelle musicale

Octave

Couper

Septième

Couper

Sixième

Couper

Quinte

Couper

Quarte

Couper

Tierce

Couper

Seconde

Couper

Tonique

Couper

Solfège

Universal musical Key

Octave

Cut

Seventh

Cut

Sixth

Cut

Fifth

Cut

Fourth

Cut

Third

Cut

Second

Cut

Tonic

Cut

Solfège

Above the ruler

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Plier

Do

Si

Si^b_{La[#]}

La^b_{Sol[#]}

Sol^b_{Fa[#]}

Fa^b_{Mi[#]}

Mi^b_{Ré[#]}

Ré^b_{Do[#]}

Do

Si

Si^b_{La[#]}

La^b_{Sol[#]}

Sol^b_{Fa[#]}

Fa^b_{Mi[#]}

Mi^b_{Ré[#]}

Ré^b_{Do[#]}

Do

Do

Si

Si^b_{La[#]}

La^b_{Sol[#]}

Sol^b_{Fa[#]}

Fa^b_{Mi[#]}

Mi^b_{Ré[#]}

Ré^b_{Do[#]}

Do

Si

Si^b_{La[#]}

La^b_{Sol[#]}

Sol^b_{Fa[#]}

Fa^b_{Mi[#]}

Mi^b_{Ré[#]}

Ré^b_{Do[#]}

Do

Utiliser une règle en plastique comme support imprimer la feuille en format légal

Couper

Tempered scale and various frequency of A

Fig.5b



HDS temperate scale Hz													
Progression %										5,94630943592953			
HDS	C	D		E		F		G		A	B		C
Do ¹²	16744	17739,688	18794,545	19912,127	21096,164	22350,607	23679,643	25087,708	26579,501	28160	29834,481	31608,531	33488
Do ¹¹	8372	8869,844	9397,273	9956,063	10548,082	11175,303	11839,822	12543,854	13289,750	14080	14917,240	15804,266	16744
Do ¹⁰	4186	4434,922	4698,636	4978,032	5274,041	5587,652	5919,911	6271,927	6644,875	7040	7458,620	7902,133	8372
Do ⁹	2093	2217,461	2349,318	2489,016	2637,020	2793,826	2959,955	3135,963	3322,438	3520	3729,310	3951,066	4186
Do ⁸	1046,50	1108,731	1174,659	1244,508	1318,510	1396,913	1479,978	1567,982	1661,219	1760	1864,655	1975,533	2093
Do ⁷	523,25	554,365	587,330	622,254	659,255	698,456	739,989	783,991	830,609	880	932,328	987,767	1046,50
Do ⁶	261,63	277,1826	293,66	311,13	329,63	349,23	369,99	392,00	415,30	440	466,16	493,88	523,25
Do ⁵	130,81	138,59	146,83	155,56	164,81	174,61	185,00	196,00	207,65	220,00	233,08	246,94	261,63
Do ⁴	65,41	69,30	73,42	77,78	82,41	87,31	92,50	98,00	103,83	110,00	116,54	123,47	130,81
Do ³	32,70	34,65	36,71	38,89	41,20	43,65	46,25	49,00	51,91	55,00	58,27	61,74	65,41
Do ²	16,35	17,32	18,35	19,45	20,60	21,83	23,12	24,50	25,96	27,50	29,14	30,87	32,70
Do ¹	8,18	8,66	9,18	9,72	10,30	10,91	11,56	12,25	12,98	13,75	14,57	15,43	16,35

Champ auditif

440,00000000000000000000000000000000

HDS temperate scale Hz													
Progression %										5,94630943592953			
HDS	C	D		E		F		G		A	B		C
Do ¹²	16820,15	17820,32	18879,97	20002,64	21192,06	22452,20	23787,28	25201,74	26700,32	28288,00	29970,09	31752,21	33640,29
Do ¹¹	8410,07	8910,16	9439,99	10001,32	10596,03	11226,10	11893,64	12600,87	13350,16	14144,00	14985,05	15876,10	16820,15
Do ¹⁰	4205,04	4455,08	4719,99	5000,66	5298,01	5613,05	5946,82	6300,44	6675,08	7072,00	7492,52	7938,05	8410,07
Do ⁹	2102,52	2227,54	2360,00	2500,33	2649,01	2806,53	2973,41	3150,22	3337,54	3536,00	3746,26	3969,03	4205,04
Do ⁸	1051,26	1113,77	1180,00	1250,16	1324,50	1403,26	1486,70	1575,11	1668,77	1768,00	1873,13	1984,51	2102,52
Do ⁷	525,630	556,89	590,00	625,08	662,25	701,63	743,35	787,55	834,38	884,00	936,57	992,26	1051,26
Do ⁶	262,815	278,44	295,00	312,54	331,13	350,82	371,68	393,78	417,19	442	468,28	496,13	525,630
Do ⁵	131,41	139,22	147,50	156,27	165,56	175,41	185,84	196,89	208,60	221,00	234,14	248,06	262,815
Do ⁴	65,70	69,61	73,75	78,14	82,78	87,70	92,92	98,44	104,30	110,50	117,07	124,03	131,41
Do ³	32,85	34,81	36,87	39,07	41,39	43,85	46,46	49,22	52,15	55,25	58,54	62,02	65,70
Do ²	16,43	17,40	18,44	19,53	20,70	21,93	23,23	24,61	26,07	27,63	29,27	31,01	32,85
Do ¹	8,213	8,70	9,22	9,77	10,35	10,96	11,61	12,31	13,04	13,81	14,63	15,50	16,43

Champ auditif

442,00000000000000000000000000000000

HDS temperate scale Hz													
Progression %										5,94630943592953			
HDS	C	D		E		F		G		A	B		C
Do ¹²	16896	17900,96	18965,40	20093,15	21287,95	22553,79	23894,91	25315,78	26821,13	28416	30105,70	31895,88	33793
Do ¹¹	8448	8950,48	9482,70	10046,57	10643,97	11276,90	11947,46	12657,89	13410,57	14208	15052,85	15947,94	16896
Do ¹⁰	4224	4475,24	4741,35	5023,29	5321,99	5638,45	5973,73	6328,94	6705,28	7104	7526,43	7973,97	8448
Do ⁹	2112	2237,62	2370,68	2511,64	2660,99	2819,22	2986,86	3164,47	3352,64	3552	3763,21	3986,99	4224
Do ⁸	1056	1118,81	1185,34	1255,82	1330,50	1409,61	1493,43	1582,24	1676,32	1776	1881,61	1993,49	2112
Do ⁷	528	559,40	592,67	627,91	665,25	704,81	746,72	791,12	838,16	888	940,80	996,75	1056
Do ⁶	264	279,70	296,33	313,96	332,62	352,40	373,36	395,56	419,08	444	470,40	498,37	528
Do ⁵	132	139,85	148,17	156,98	166,31	176,20	186,68	197,78	209,54	222	235,20	249,19	264
Do ⁴	66	69,93	74,08	78,49	83,16	88,10	93,34	98,89	104,77	111	117,60	124,59	132
Do ³	33	34,96	37,04	39,24	41,58	44,05	46,67	49,44	52,39	55,50	58,80	62,30	66
Do ²	16,50	17,48	18,52	19,62	20,79	22,03	23,33	24,72	26,19	27,75	29,40	31,15	33
Do ¹	8,25	8,74	9,26	9,81	10,39	11,01	11,67	12,36	13,10	13,88	14,70	15,57	16,50

Champ auditif

444,00000000000000000000000000000000

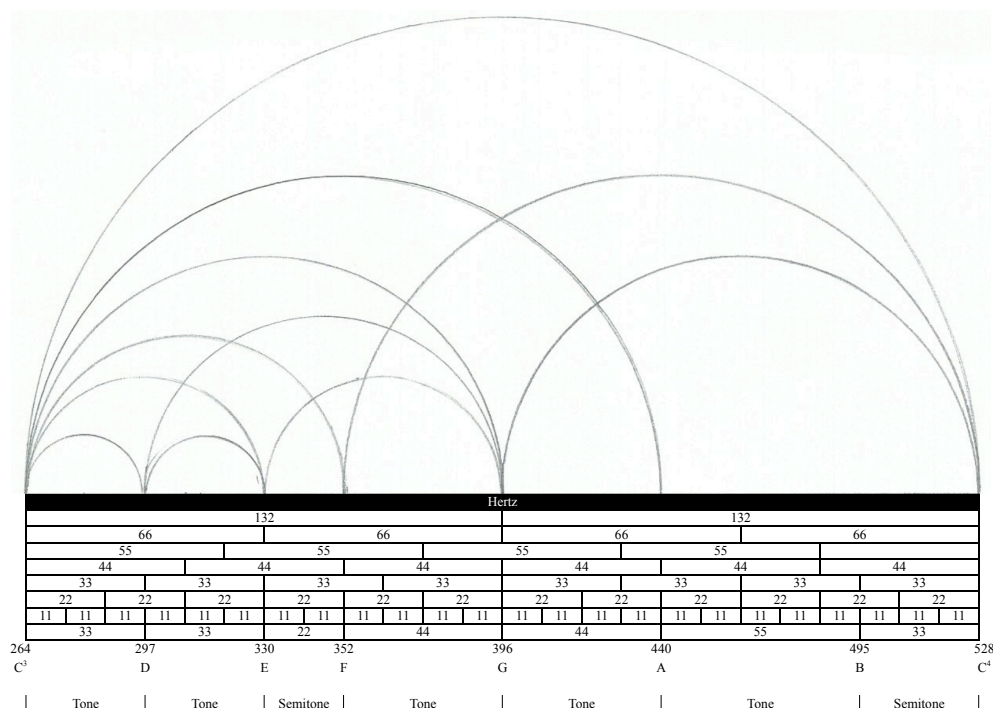
*** For more details on temperate scale see the section R/D

Pythagore and the harmony of the spheres

Fig.7

HARMONY OF THE SPHERES

MUSICAL UNIVERSAL KEY



HDS Universal Proportion

1,125	1,111	1,06666667	1,125	1,111	1,125	1,06666667
1,250	1,250	1,250				
1,500	1,33333333	1,66666667	1,2	1,500	1,6	1,875
1,33333333	1,500	1,6	1,875	1,06666667		

HDS Fraction Pythagorean

1 1/8	1 1/4	1 1/3	1 1/2	1 2/3	1 7/8	2
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For more details on natural harmonics see the section R/D

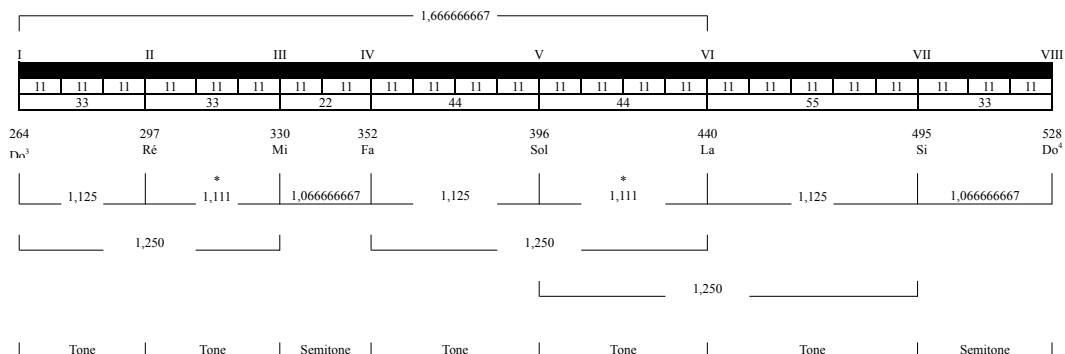
« Natural Harmonics »

Fig.7a



NATURAL HARMONICS

Starting from the fact that the natural resonance (harmonics) of each note are relatively all multiples of each of them and the frequency (Hz) is given by the simple arithmetic operation of fundamental sound F^0 multiplication by the rank number of it



II	X	=
11	1	11
11	2	22
11	3	33
11	4	44
11	5	55
11	6	66
11	7	77
11	8	88
11	9	99
11	10	110
11	11	121
11	12	132
11	13	143
11	14	154
11	15	165
11	16	176
11	17	187
11	18	198
11	19	209
11	20	220
11	21	231
11	22	242
11	23	253

Octave	11	24	264	C	1
	11	25	275		2
	11	26	286		3
Second	11	27	297	D	4
	11	28	308		5
	11	29	319		6
Third	11	30	330	E	7
	11	31	341		8
Fourth	11	32	352	F	9
	11	33	363		10
	11	34	374		11
	11	35	385		12
Fifth	11	36	396	G	13
	11	37	407		14
	11	38	418		15
	11	39	429		16
Sixth	11	40	440	A	17
	11	41	451		18
	11	42	462		19
	11	43	473		20
	11	44	484		21
Seventh	11	45	495	B	22
	11	46	506		23
	11	47	517		24
Octave	11	48	528	C	25

For more details on natural harmonics see figures 6 and 7 section R/D

Note that the ratio between A 440 Hz and C 264 Hz has a proportion of

$$1.666666666666667$$

$$\text{either: } 440/264 = 1.666666666666667$$

this proportion will never change ... whatever the frequency chosen:

$$\dots 328 - 426,7 - 432 - 440 - 442 - 444 \dots$$

it's a good way to find your C

then divide it by 24 to get what I call the unit of measure.

P: S. The tuning frequency of A at 426.7 Hz also called Scientific range
or Range of physicists, with a Do at 256 Hz

$$\text{either : } 426.6666666666667 / 256 = 1.666666666666667.$$

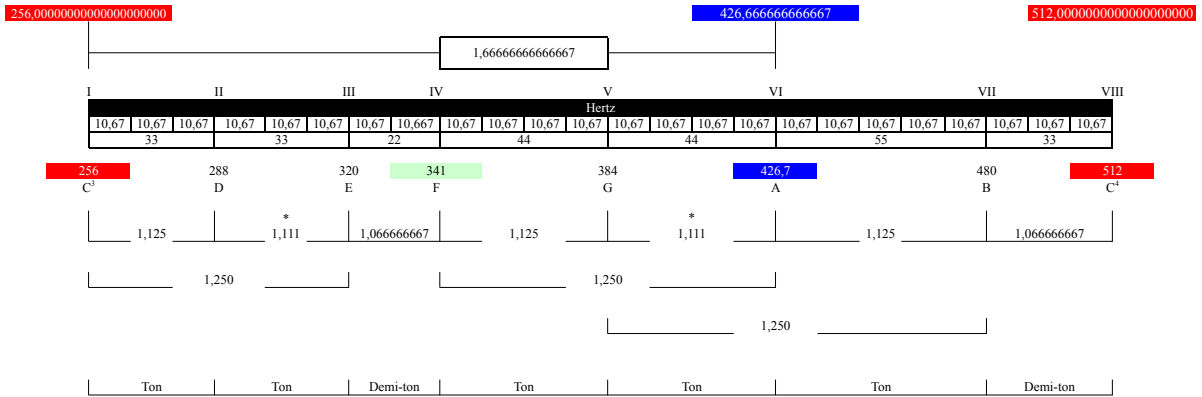
Fig.7f



NATURAL HARMONICS

426,7 Hz

Starting from the fact that the natural resonance (harmonics) of each note are relatively all multiples of each of them and the frequency (Hz) is given by the simple arithmetic operation of fundamental sound F0 multiplication by the rank number of it



10,666666666667					
10,67		X	=		
10,67	1	10,67			
10,67	2	21,33			
10,67	3	32			
10,67	4	42,67			
10,67	5	53,33			
10,67	6	64			
10,67	7	74,67			
10,67	8	85,33			
10,67	9	96			
10,67	10	106,7			
10,67	11	117,3			
10,67	12	128			
10,67	13	138,7			
10,67	14	149,3			
10,67	15	160			
10,67	16	170,7			
10,67	17	181,3			
10,67	18	192			
10,67	19	202,7			
10,67	20	213,3			
10,67	21	224			
10,67	22	234,7			
10,67	23	245,3			
Octave	10,67	24	256	C	1
Seconde	10,67	25	267,7		2
	10,67	26	279,3		3
	10,67	27	288	D	4
Tierce	10,67	28	298,7		5
	10,67	29	309,3		6
Quarte	10,67	30	320	E	7
	10,67	31	330,7		8
Quinte	10,67	32	341,3	F	9
	10,67	33	352		10
	10,67	34	362,7		11
Sixième	10,67	35	373,3		12
	10,67	36	384	G	13
	10,67	37	394,7		14
Septième	10,67	38	405,3		15
	10,67	39	416		16
	10,67	40	426,7	A	17
Octave	10,67	41	437,3		18
	10,67	42	448		19
	10,67	43	458,7		20
Septième	10,67	44	469,3		21
	10,67	45	480	B	22
	10,67	46	490,7		23
Octave	10,67	47	501,3		24
	10,67	48	512	C	25

341,333333333334

426,66666666667

For more details on natural harmonics see figures 6 and 7 section R/D

Fig.7H



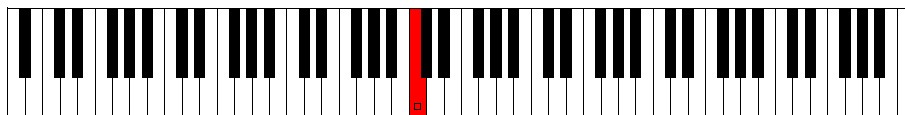
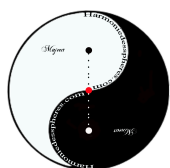
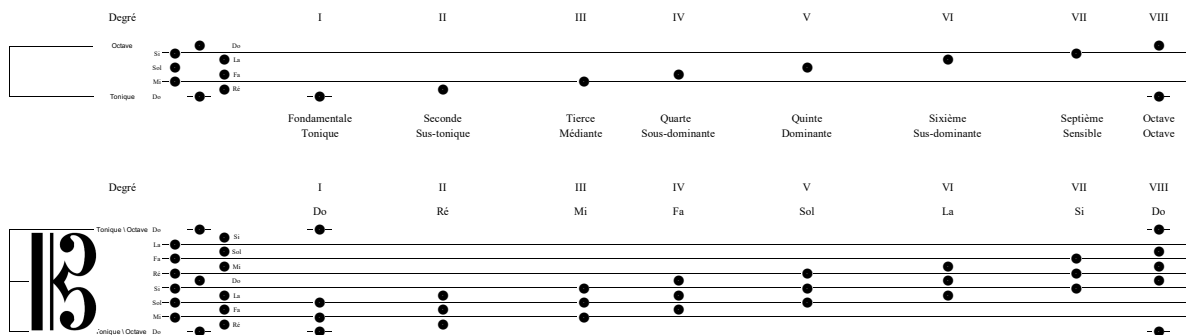
LES HARMONIQUES NATURELLES - NATURAL HARMONICS

F	352	C	264	G	391,111	D	293,333
1	14,6666667	11	11	16,2962963	1	12,2222222	1
2	29,3333333	22	22	32,5925926	2	24,4444444	2
3	44	33	33	48,8888889	3	36,6666667	3
4	58,6666667	44	44	64,5185185	4	49	4
5	73,3333333	55	55	81,4814815	5	61,1111111	5
6	88	66	66	97,7777778	6	73,3333333	6
7	102,6666667	77	77	114,4747474	7	85,5555556	7
8	117,3333333	88	88	130,7676767	8	97,7777778	8
9	132	99	99	146,6666667	9	109	9
10	146,6666667	10	10	162,962963	10	122,222222	10
11	161,3333333	11	11	179,2525252	11	136,4444444	11
12	176	12	12	195,5555556	12	148,6666667	12
13	190,6666667	13	13	212,0512051	13	160,8888889	13
14	205,3333333	14	14	228,1481481	14	173,1111111	14
15	220	15	15	244,6444444	15	185,3333333	15
16	234,6666667	16	16	260,7407407	16	197,5555556	16
17	249,3333333	17	17	277,0777778	17	209,7777778	17
18	264	18	18	293,3333333	18	222,222222	18
19	278,6666667	19	19	309,4294294	19	234,4444444	19
20	293,3333333	20	20	325,9259259	20	246,6666667	20
21	308	21	21	342,222222	21	258,8888889	21
22	322,6666667	22	22	358,5185185	22	271,1111111	22
23	337,3333333	23	23	374,8148148	23	283,3333333	23
24	352	24	24	391,1111111	24	295,5555556	24
25	366,6666667	25	25	407,4074074	25	307,7777778	25
26	381,3333333	26	26	423,7037037	26	319,9999999	26
27	396	27	27	440,0000000	27	332,222222	27
28	410,6666667	28	28	456,2962963	28	344,4444444	28
29	425,3333333	29	29	472,5925926	29	356,6666667	29
30	440	30	30	488,8888889	30	368,8888889	30
31	454,6666667	31	31	505,1851852	31	381,1111111	31
32	469,3333333	32	32	521,4814815	32	393,3333333	32
33	484	33	33	537,7777778	33	405,5555556	33
34	498,6666667	34	34	554,0740741	34	417,7777778	34
35	513,3333333	35	35	570,3703704	35	429,9999999	35
36	528	36	36	586,6666667	36	442,222222	36
37	542,6666667	37	37	602,9629629	37	454,4444444	37
38	557,3333333	38	38	619,2592593	38	466,6666667	38
39	572	39	39	635,5555556	39	478,8888889	39
40	586,6666667	40	40	651,8518519	40	491,1111111	40
41	601,3333333	41	41	668,1481481	41	503,3333333	41
42	615,6666667	42	42	684,4444444	42	515,5555556	42
43	630,6666667	43	43	700,7407407	43	527,7777778	43
44	645,3333333	44	44	717,0370371	44	539,9999999	44
45	660	45	45	733,3333333	45	552,222222	45
46	674,6666667	46	46	749,6296296	46	564,4444444	46
47	689,3333333	47	47	765,9259259	47	576,6666667	47
48	704	48	48	782,222222	48	588,8888889	48
1	18,3333333	1	11,75	20,625	1	19,5555556	1
2	36,6666667	2	23,5	41,25	2	39,1111111	2
3	55	3	35,75	62	3	58,6666667	3
4	73	4	51,5	82,5000000	4	78,2222222	4
5	91,6666667	5	67,25	103,125	5	97,7777778	5
6	109,3333333	6	83	123,75	6	117,3333333	6
7	127,6666667	7	99,5	144,375	7	136,8888889	7
8	146,6666667	8	116	165	8	156,4444444	8
9	165,3333333	9	133,75	186,25	9	176,0000000	9
10	184,6666667	10	151,5	207,5	10	195,5555556	10
11	204,6666667	11	169,75	228,75	11	215,1111111	11
12	224,6666667	12	188	249,5	12	234,6666667	12
13	244,6666667	13	206,75	269,75	13	254,222222	13
14	264,6666667	14	225	289,5	14	273,7777778	14
15	284,6666667	15	243,75	309,75	15	293,3333333	15
16	304,6666667	16	262,5	329,25	16	312,8888889	16
17	324,6666667	17	281,25	348,75	17	332,4444444	17
18	344,6666667	18	300	368,25	18	352	18
19	364,6666667	19	318,75	387,75	19	371,5555556	19
20	384,6666667	20	337,5	407,25	20	391,1111111	20
21	404,6666667	21	356,25	426,75	21	410,6666667	21
22	424,6666667	22	375	446,25	22	430,222222	22
23	444,6666667	23	393,75	465,75	23	449,7777778	23
24	464,6666667	24	412,5	485,25	24	469,3333333	24
25	484,6666667	25	431,25	504,75	25	488,8888889	25
26	504,6666667	26	450	524,25	26	508,4444444	26
27	524,6666667	27	468,75	543,75	27	527,9999999	27
28	544,6666667	28	487,5	563,25	28	547,5555556	28
29	564,6666667	29	506,25	582,75	29	567,1111111	29
30	584,6666667	30	525	602,25	30	586,6666667	30
31	604,6666667	31	543,75	621,75	31	606,222222	31
32	624,6666667	32	562,5	641,25	32	625,7777778	32
33	644,6666667	33	581,25	660,75	33	645,3333333	33
34	664,6666667	34	600	680,25	34	664,8888889	34
35	684,6666667	35	618,75	700,75	35	684,4444444	35
36	704,6666667	36	637,5	720,25	36	704	36
37	724,6666667	37	656,25	740,75	37	723,5555556	37
38	744,6666667	38	675	760,25	38	743,1111111	38
39	764,6666667	39	693,75	780,75	39	762,6666667	39
40	784,6666667	40	712,5	800,25	40	782,222222	40
41	804,6666667	41	731,25	820,75	41	801,7777778	41
42	824,6666667	42	750	840,25	42	821,3333333	42
43	844,6666667	43	768,75	860,75	43	840,8888889	43
44	864,6666667	44	787,5	880,25	44	860,4444444	44
45	884,6666667	45	806,25	900,75	45	880,0000000	45
46	904,6666667	46	825	920,25	46	900,5555556	46
47	924,6666667	47	843,75	940,75	47	920,1111111	47
48	944,6666667	48	862,5	960,25	48	940,6666667	48
1	13,85703704	1	17,6	11,7333333	1	15,6444444	1
2	27,71407407	2	35,2	23,4666667	2	31,2888889	2
3	41,5703704	3	52,8	35,2	3	46,9333333	3
4	55,42854545	4	70,4000000	47,6	4	62,5777778	4
5	69,28671429	5	88	59,4666667	5	78,2222222	5
6	83,14285714	6	106,8	71,3333333	6	93,9666667	6
7	97,00000000	7	125,2	83,2000000	7	109,5111111	7
8	110,85714286	8	144,0	95,0666667	8	125,1555556	8
9	124,71428571	9	162,4	106,9333333	9	140,7	9
10	138,57142857	10	180,8	118,8000000	10	156,4444444	10
11	152,42857143	11	200,0	130,6666667	11	172,0000000	11
12	166,28571429	12	218,4	142,5333333	12	187,7333333	12
13	180,14285714	13	236,8	154,4000000	13	203,4666667	13
14	194,00000000	14	255,2	166,2666667	14	219,2222222	14
15	207,85714286	15	273,6	178,1333333	15	234,6666667	15
16	221,71428571	16	292,0	190,0000000	16	250,3111111	16
17	235,57142857	17	310,4	201,8666667	17	265,5555556	17
18	249,42857143	18	328,8	213,7333333	18	280,7777778	18
19	263,28571429	19	347,2	225,6000000	19	295,9999999	19
20	277,14285714	20	365,6	237,4666667	20	312,0000000	20
21	291,00000000	21	384,0	249,3333333	21	328,3333333	21
22	304,85714286	22	402,4	261,2000000	22	344,1777778	22
23	318,71428571	23	420,8	273,0666667	23	359,9999999	23
24	332,57142857	24	439,2	284,9333333	24	375,8888889	24
25	346,42857143	25	457,6	296,8000000	25	391,8111111	25
26	360,28571429	26	476,0	308,6666667	26	407,7333333	26
27	374,14285714	27	494,4	320,5333333	27	423,6666667	27
28	388,00000000	28	512,8	332,4000000	28	439,5555556	28
29	401,85714286	29	531,2	344,2666667	29	455,4444444	29
30	415,71428571	30	549,6	356,1333333	30	471,3333333	30
31	429,57142857	31	568,0	368,0000000	31	487,222222	31
32	443,42857143	32	586,4	379,8666667	32	503,1111111	32
33	457,28571429	33	604,8	391,7333333	33	519,0000000	33
34	471,14285714	34	623,2	403,6000000	34	534,8888889	34
35	485,00000000	35	641,6	415,4666667	35	550,7777778	35
36	498,85714286	36	660,0	427,3333333	36	566,6666667	36
37	512,71428571	37	678,4	439,2000000	37	582,5555556	37
38	526,57142857	38	696,8	451,0666667	38	598,4444444	38
39	540,42857143	39	715,2	462,9333333	39	614,3333333	39
40	554,28571429	40	733,6	474,8000000	40	630,222222	40
41	568,14285714	41	752,0	486,6666667	41	646,1111111	41
42	582,00000000	42	770,4	498,5333333	42	662,0000000	42
43	595,85714286	43	788,8	510,4000000	43	677,8888889	43
44	609,71428571	44	807,2	522,2666667	44		

Fig.8

Harmonie des sphères

Clé universelle musicale
Le Diatonisme



Le premier Solfège

Titre: _____ Auteur: _____

C

B

A

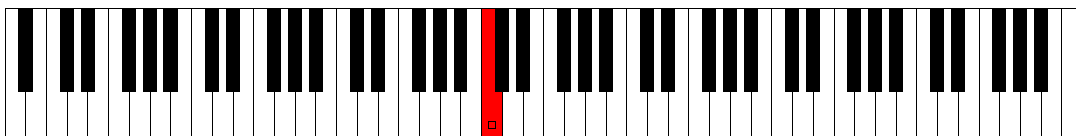
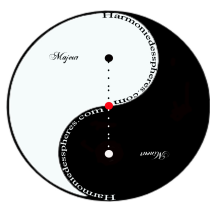
G

F

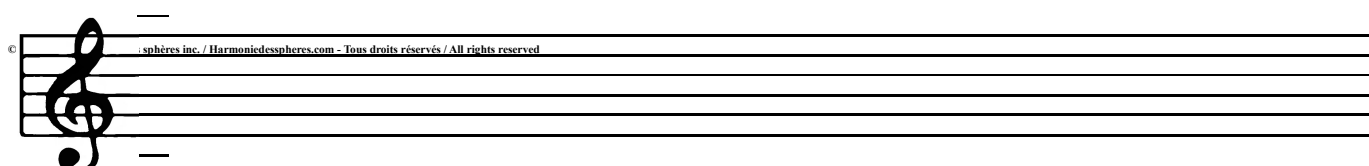
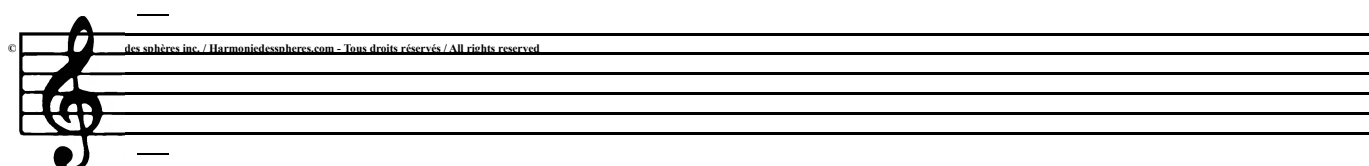
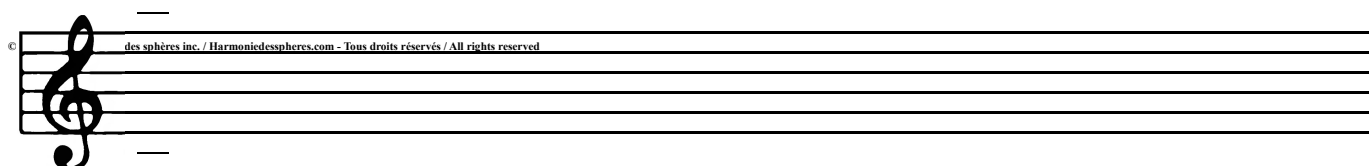
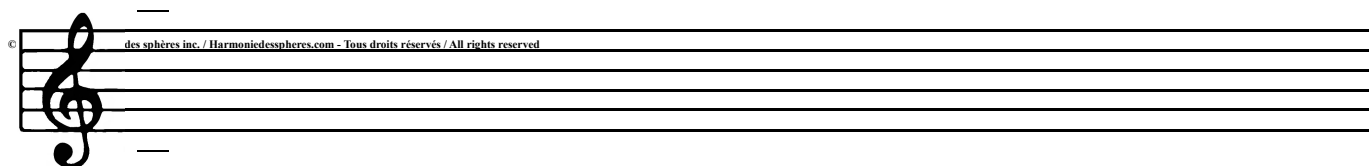
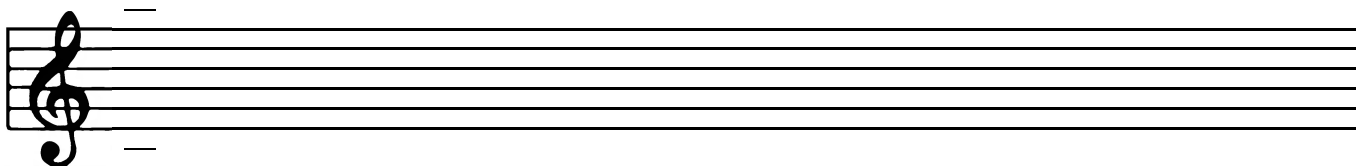
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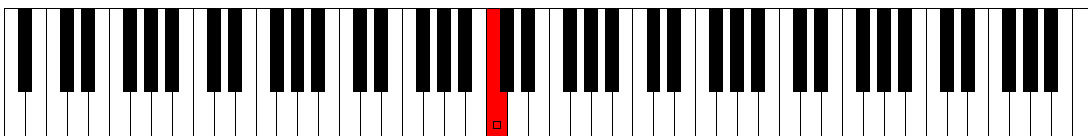
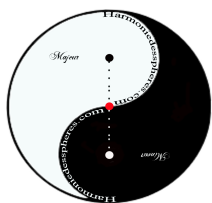
D

C



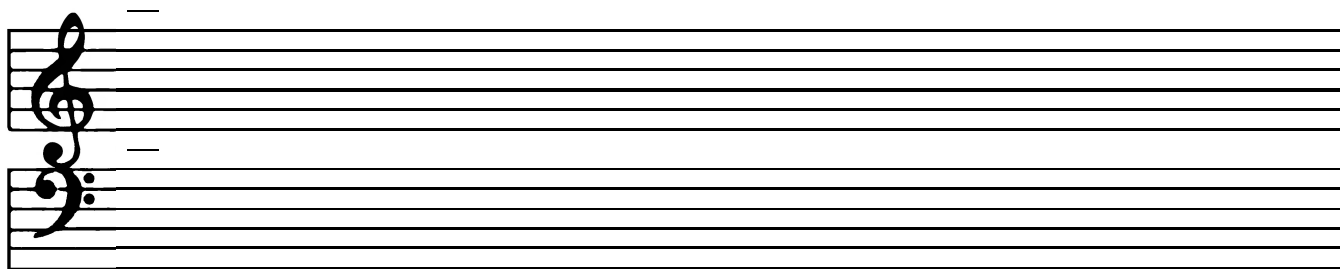
Titre: _____ Auteur: _____



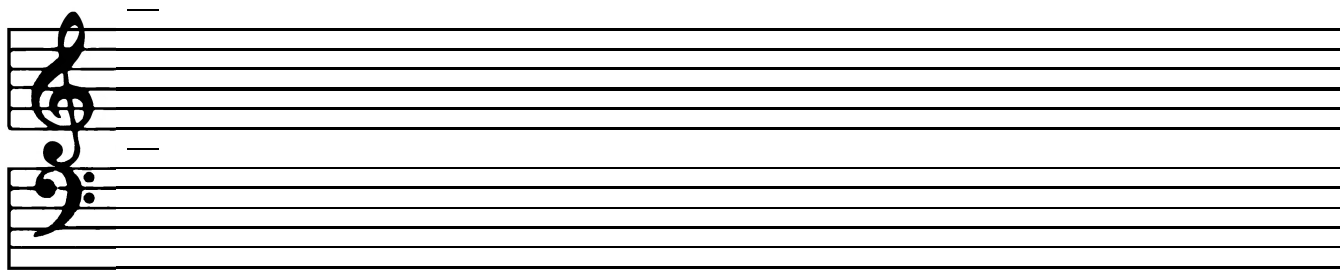


Titre: _____

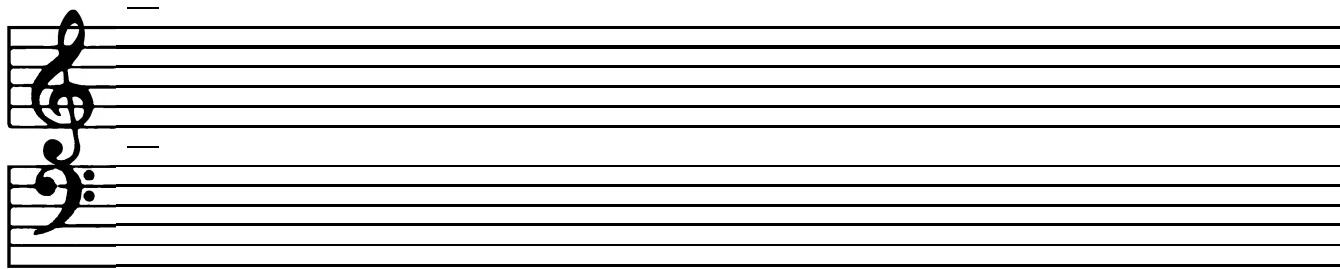
Auteur: _____



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research and develop simple and accessible applications
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