SHAPE A COMPOSITIONAL PROGRAM, A USER DESCRIPTION

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SHAPE

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The following is a very quick 'last minute' description and explaination of a compositional program which I was working on during the summer of 1982. The end result of the program in its present form is: SEXTET files, which are writeen onto the disc and ready for use with Tempelaar's program SEXTET. The reason I describe this as a last minute description is that is what it is. I originally had no plans to leave the program or documentation because it is still in an unfinished state; but just before leaving the Instituut I decided "what the hell" and thought that it might be of use and/or interest to someone. I am also leaving SOURCE programs as well as XCT,XCU files since the program is in working order and does produce SEXTET files as I stated above. This could be of interest to the lazy typist or someone interested in exploring compositional programs or even a combination of the two. Since the SOURCE programs are also here feel free to adapt them to personal purposes or "cannabalize" them. (By this I mean, use only some of the programs within another context.) Someone has already used the data base and disc writing routines with their own compositional routines for producing SEXTET output.

I will be continuing work on the program at wherever I go next and my final objective is a compositional program for intrumental music and a compositional program for computer sound output. The two programs will have certain basic ideas in common; but will remain exclusive of each other because of my basic belief that instumental music and electronic music have very little in common. But, I repeat, that the program in its present state is only a skeletal version of my final plan.

A user of SHAPE is advised to have prior knowledge of SEXTET. SHAPE contains a data base of all possible input values for creating SEXTET files and the purpose is to map "shapes" or lists onto this data base. The program has 30 shapes in a library which can be utilized and/or the user can create his/her own shapes either starting with user input or a library shape. (The shapes are shown on a later page of this description).

SEXTET enables one to specify values for 4 parameters: pitch,dynamics, mode (of attack),and duration. There are 192 possible pitches ranging from C1 to B8, 25 dynamics (P tp FFF), 3 modes, and 256 durations. (Actually there are more dynamic possibilities but they are impractical since the COMPOSITE VOSIM output of SEXTET is almost inaudible on the low

end if the full range is used.) So, as you may have guessed, the data base for SHAPE contains this information for the 4 parameters. The user's task is to map lists of numbers (shapes) onto this data base. This is done simply by indexing the SEXTET information via numbers contained in arrays. (Array=list=shape). A simple example: to produce an ascending scale from the lowest possible pitch to the highest: just choose the ramp shape (/) and specify the low value as 1 and the high as 192. The number of notes is variable up to 999. Only one voice for all four parameters can be created at a time.

SHAPE is parametrically non-hierarchic. Mutual dependencies can only occur when later decisions depend on previous ones. This type of situation is patently avoided.

The main restriction that the program has is that it does not understand erroneous data in the sense of data which is outside the range of a particular parameter being created. For example: the only values meaningful for dynamics are the numbers 1 through 25. The value 26 (pertaining to the dynamics data) is outside the dynamics range and therefore nonsense. The program automatically "corrects" values above or below the particular parameter range by just making the out-of-range values either the lowest or highest value possible depending on whether the value is below or above the minimum and maximum. +THE PROGRAM DOES NOT TELL THE USER ABOUT THIS "CORRECTION" PROCEDURE. So, it is up to the user to be aware of the values being used.

I will now attempt to go through some of the questions a user must answer in using the program. This will not be a detailed description and it is suggested that some simple experiments will tend to clarify any vagarities on my part...(1) first the random number generator must be seeded (2) then before a SEXTET file can be created, four shapes must be made first for the four parameters mentioned above. (3) one then goes into a loop to make the four shapes in the order: pitch, dynamics, mode, and finally duration. (4) the next is a bit complicated since this is the main menu of the program: 1= choose a simple library shape, 2=no, this allows one to reuse a shape from a previously created file if the program has not been stopped and is useful if groups of similar files are being created. 3=user can input his own values for a shape. 4=a piece-wise shape can be created drawing on all library shapes or user input to create any shape the user desires. The next three possibilities enable the user to create a second shape. THe reason for this is that one of the most important aspects of this program which has not been

mentioned yet, is that the user can create shapes via operations that the program makes available. Operations can operate on previous operations as many times as is desired to create desirable shapes. 5=allows the redefinition of a previously created shape whereby slices of a shape can be repeated, a shape can be incremented at a certain value and a shape begin at any point (for instance, in the middle of a shape). 6=a tendency range around a previously specified shape can be calculated. Static or dynamic (changing over time) tendencies can be specified. 7=a second shape can be created and then added to a first shape to create a third (the same concept as in additive synthesis). The resulting addition is divided by two. This operation should be used with the caution mentioned above kept in mind: the final values need to be kept in the range desired. 8=just carries out the addition of no. 7 above. All operations can be recursively reentered. One could carry out a series of operations to produce one final shape. EXAMPLE: choose a simple library shape, create a tendency around this shape, add this shape to a second shape that is user input, use the shape redefinition possibility, make a second shape via piece-wise building, add it to the first, and then choose no. 2 to CONTINUE. This ends that shape's creation.

RESTS are possible in the pitch shape.Two types of rest possibilities exist. A random range within the shape can be specified or a rest 'slice'. Location begin and end points must be specified for the random range. The locations are the rest target area. A min/max range for the number (quantity) of rests in this location range is then specified. A random number of rests within this range is created in the target area of the pitch shape. With the second possibility, an entire slice of the shape becomes rests.(The whole target area as a block.) The rest possibility can be entered as many times as desired.

At any time during shape and/or rest creation work the present state of things can be viewed on the oscilliscope by patching the first DAC (of computers A or B), plotted on the Phillips plotter, or printed on the terminal or the printer. This is handy in making checks to be sure a shape is not outside of the desired range. A history of all work done to create the four shapes before making a SEXTET file of them can be printed on the terminal or the printer.

One important step before creating the SEXTET file is the total time for the file and its relation to the metronome value needed for a SEXTET file. This enables one to give a common metronome value to separate voices and the total time for the voices is given. Or, coming from the other direction

in terms of time, a specific total time for a file can be specified and the necessary metronome value is given by the program. This allows for instance, for files to end at precisely the same time while their inner time values may be unrelated.

Finally a SEXTET file can be written on the disc. A five letter name is necessary (the extension SRC is assumed for convenience) and a metronome value is given. Files can be concatenated also. The 'target file' is a pre-existing file on disc which one may wish to add to.

This ends my very brief explanation. If for some reason this seems complicated, it is easier to use then to read about. (or write about for that matter)...

```
 07-MAR-83
DIRECTORY LISTING
   436 FREE BLKS
    17 USER FILES
    10 SYSTEM BLKS
SEXTET XCT      1     1
SEXTET XCU     -2   124
XIPP1  FAT      6    41
INSTR  SRC      4     6
MAIN   SRC     10     3
SHAPE  XCT      3     1
SHAPE  XCU      5   127
TOY3   SRC     27    22
WAVE   SRC     42    16
VIEW   SRC    162     2
ZARRAY SRC    173     2
HIST1  SRC    174    10
FILE2  SRC    205     6
TIME2  SRC    243     4
DADA   SRC    244    15
```

FOUND ON DT "SEXTET BIN"

(1) All SRC extensions except INSTR SRC are SOURCE programs for SHAPE.

(2) INSTR SRC is an instrument file which can be used with SEXTET.

(3) XIPP1 FAT is an F-A-T file of 6 voices made from SHAPE files and ready for playing with SEXTET.

```
PARAMETER 1 SHAPE
 105 123 130 128 112  92  77  74  84 103 105 123 130 128 112  92  77
  74  84 103 105 123 130 128 112  92  77  74  84 103 105 123 130 128
 112  92  77  74  84 103 105 123 130 128 112  92  77  74  84 103 105
 123 130 128 112  92  77  74  84 103 105 123 130 128 112  92  77  74
  84 103 105 123 130 128 112  92  77  74  84 103 105 123 130 128 112
  92  77  74  84 103 105 123 130 128 112  92  77  74  84 103
```

```
                    ***SHAPE***
                  FILE HISTORY

SEED VALUE:       1
SHAPE SIZE: 100

PARAMETER: 1
SHAPE MIN MAX
   10  74 130

SHAPE REDEFINITION:
BEGIN END INC START
    1 100  11    1

TENDENCY:
MINU MAXU MINL MAXL
  0    5    0    5

PARAMETER: 2
SHAPE MIN MAX
    3  18  25

PARAMETER: 3
SHAPE MIN MAX
    3   1   3

PARAMETER: 4
SHAPE MIN MAX
   10  10  30

SHAPE REDEFINITION:
BEGIN END INC START
    1 100  12    1

TENDENCY:
MINU MAXU MINL MAXL
  0    4    0    4
```

this is an example of SHAPE output of user work including a score file as written on disc for input to SEXTET.

```
                ** REST INFORMATION **

      REST RANGE     NUMBER OF RESTS     LOCATION RANGE
        20,  30            26              1, 100
         0,   0             5              1,   5
         0,   0             6             15,  20
         0,   0            11             30,  40
         0,   0             7             55,  61
         0,   0             7             73,  79
         0,   0             5             88,  92
         0,   0             3             96,  98
         2,   3             3              1,  10

MAXIMUM NUMBER OF RESTS =  73
```

```
TOTAL TIME FOR FILE AT METRO =    60  IS:    34.603
TOTAL TIME FOR FILE AT METRO =    96  IS:    21.447

FILE NAME = XIPP6 SRC
METRONOME VALUE =  96

XIPP6 SRC
M    96
   ; FF  ;    4   ;       ;
   ;  F+2;P  6.   ;       ;
   ;  F+3;    9.. ;       ;
   ; FF+2;P  5    ;       ;
   ;  F+1;P  6.   ;       ;
B 4; FF  ;P  3    ;       ;
   ; FF+2;P  2    ;       ;
B 3;  F+1;P  3.. ;       ;
F#4; FF+3;P  5.   ;       ;
CX5;  F+1;   7.. ;       ;
   ; FF  ;    8...;       ;
D 6; FF-2;P 10.. ;       ;
DX6; FF+3;P  9...;       ;
   ; FF  ;    7.. ;       ;
   ;  F+2;    4.   ;       ;
   ; FF+1;P  4...;       ;
   ;  F+3;P  3...;       ;
   ;  F+2;    5.   ;       ;
   ;  F+3;    3    ;       ;
   ; FF+2;P  9...;       ;
D#5;  F+1;P 10.. ;       ;
   ; FF  ;P  9.. ;       ;
E 6; FF+2;    5.. ;       ;
D@6;  F+3;    4...;       ;
   ; FF+2;    2.   ;       ;
   ; FF+3;    5...;       ;
C#4; FF+3;P  6...;       ;
CX4; FF  ;   6...;       ;
F 4; FF+2;P  4    ;       ;
   ;  F+3;    9.. ;       ;
   ; FF+1;P  8...;       ;
   ; FF+1;P  7...;       ;
   ;  F+2;P  3.   ;       ;
   ; FF+1;P  4.. ;       ;
   ;  F+3;    2    ;       ;
   ; FF+3;P  6.. ;       ;
   ;  F+1;P  7...;       ;
   ; FF+3;P  8...;       ;
   ; FF  ;    8.   ;       ;
   ; FF+2;P  9.. ;       ;
D@5; FF+1;P  4    ;       ;
D 6;  F+3;P  3.. ;       ;
E@6; FF+1;P  2    ;       ;
CX6; FF+1;   4.   ;       ;
   ;  F+2;    7.. ;       ;
A#4;  F+1;    5.. ;       ;
B 3;  F+1;    6.   ;       ;
D#4; FF+3;P  8.. ;       ;
   ; FF+3;    8.   ;       ;
D@5; FF  ;P  6.. ;       ;
   ;  F+2;    3.   ;       ;
```

```
E 5;   F+3;P   3.. ;        ;
F@6;   F+2;P   4.  ;        ;
CX6; FF+3;     7.. ;        ;
   ; FF+3;P    5.. ;        ;
   ;  F+1;P    8.  ;        ;
   ; FF+3;P    9.. ;        ;
   ; FF  ;P    5   ;        ;
   ; FF+2;     3   ;        ;
   ; FF+3;     3.. ;        ;
   ;  F+1;     2.. ;        ;
B@5; FF  ;P    3.  ;        ;
DX6;   F+2;P   5.. ;        ;
E 6; FF+3;P    4   ;        ;
A#5; FF  ;P    7.  ;        ;
C@5;   F+2;P  10.. ;        ;
CX4;   F+1;    9...;        ;
CX4;   F+1;P   5.  ;        ;
E 4; FF+3;P    3.  ;        ;
E@5; FF  ;     2.  ;        ;
D#5; FF+2;P    4...;        ;
D@6;   F+3;P   6.. ;        ;
   ; FF+2;P    5.  ;        ;
   ; FF+1;     4   ;        ;
   ; FF+1;P    8.  ;        ;
   ; FF+3;P    5   ;        ;
   ;  F+1;P    7...;        ;
   ; FF  ;P    3.  ;        ;
   ; FF+2;P    2.  ;        ;
E@5; FF+3;P    2   ;        ;
D#5;   F+1;    5.. ;        ;
D 6; FF  ;P    5.  ;        ;
E@6; FF+2;P    8...;        ;
E 6; FF+3;P    7.  ;        ;
   ;  F+1;P    8.  ;        ;
G 4; FF+3;P    6.. ;        ;
C 4; FF  ;     3.  ;        ;
   ; FF+2;P    4.. ;        ;
   ;  F+1;P    2.  ;        ;
   ; FF  ;     6...;        ;
   ; FF+2;     6...;        ;
   ; FF+3;P    8.. ;        ;
D#6; FF+3;    10...;        ;
   ;  F+1;     4   ;        ;
   ; FF  ;P    5.. ;        ;
   ;  F+2;     3   ;        ;
   ;  F+1;     2.. ;        ;
   ; FF+3;     3.  ;        ;
   ;  F+1;     6.. ;        ;
   ;  F+1;P    7...;        ;
```

SHAPE
FILE HISTORY

SHAPE SIZE: 25

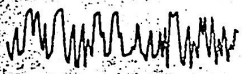
PARAMETER: 1

SHAPE	MIN	MAX
29	50	97

STORED LIBRARY OF SHAPES AT USER DISPOSAL


1


2


3


4


5


6

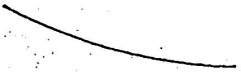

7


8

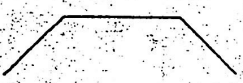

9


10


11


12

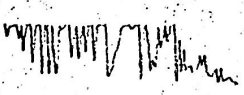

13

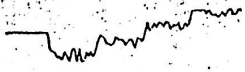

14

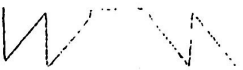

15


16


17


18

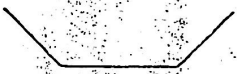

19

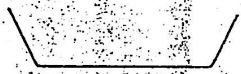

20


21


22


23


24


25


26


27


28


29


30

CHART OF ALL POSSIBLE PARAMETER VALUES

TIMES REFER TO METRONOME VALUE = 60

	PCH	DYN	MODE	DUR	(TIME OF DUR)	
1	C@1	PP		1...	1.875000	1
2	C 1	PP+1	P	1..	1.750000	2
3	C#1	PP+2	S	1.	1.500000	3
4	CX1	PP+3		1	1.000000	4
5	D@1	P		2...	0.937500	5
6	D 1	P+1		2..	0.875000	6
7	D#1	P+2		2.	0.750000	7
8	DX1	P+3		3...	0.625000	8
9	E@1	MP		3..	0.583333	9
10	E 1	MP+1		2	0.500000	10
11	F@1	MP+2		3.	0.500000	11
12	F 1	MP+3		4...	0.468750	12
13	F#1	MF		4..	0.437500	13
14	FX1	MF+1		4.	0.375000	14
15	G@1	MF+2		5...	0.375000	15
16	G 1	MF+3		5..	0.350000	16
17	G#1	F		3	0.333333	17
18	GX1	F+1		6...	0.312500	18
19	A@1	F+2		5.	0.300000	19
20	A 1	FF		6..	0.291667	20
21	A#1	FF+1		7...	0.267857	21
22	AX1	FF+2		7..	0.250000	22
23	B@1	FF+3		6.	0.250000	23
24	B 1	FFF		4	0.250000	24
25	C@2			8...	0.234375	25
26	C 2			8..	0.218750	26
27	C#2			7.	0.214286	27
28	CX2			9...	0.208333	28
29	D@2			5	0.200000	29
30	D 2			9..	0.194444	30
31	D#2			8.	0.187500	31
32	DX2			10...	0.187500	32
33	E@2			10..	0.175000	33
34	E 2			11...	0.170455	34
35	F@2			6	0.166667	35
36	F 2			9.	0.166667	36
37	F#2			11..	0.159091	37
38	FX2			12...	0.156250	38
39	G@2			10.	0.150000	39
40	G 2			12..	0.145833	40
41	G#2			13...	0.144231	41
42	GX2			7	0.142857	42
43	A@2			11.	0.136364	43
44	A 2			13..	0.134615	44
45	A#2			14...	0.133929	45
46	AX2			14..	0.125000	46
47	B@2			12.	0.125000	47
48	B 2			8	0.125000	48
49	C@3			15...	0.125000	49
50	C 3			16...	0.117187	50
51	C#3			15..	0.116667	51
52	CX3			13.	0.115385	52
53	D@3			9	0.111111	53
54	D 3			17...	0.110294	54
55	D#3			16..	0.109375	55
56	DX3			14.	0.107143	56

57	E@3	18...	0.104167	57
58	E 3	17..	0.102941	58
59	F@3	10	0.100000	59
60	F 3	15.	0.100000	60
61	F#3	19...	0.098684	61
62	FX3	18..	0.097222	62
63	G@3	16.	0.093750	63
64	G 3	20...	0.093750	64
65	G#3	19..	0.092105	65
66	GX3	11	0.090909	66
67	A@3	21...	0.089286	67
68	A 3	17.	0.088235	68
69	A#3	20..	0.087500	69
70	AX3	22...	0.085227	70
71	B@3	18.	0.083333	71
72	B 3	12	0.083333	72
73	C@4	21..	0.083333	73
74	C 4	23...	0.081522	74
75	C#4	22..	0.079545	75
76	CX4	19.	0.078947	76
77	D@4	24...	0.078125	77
78	D 4	13	0.076923	78
79	D#4	23..	0.076087	79
80	DX4	25...	0.075000	80
81	E@4	20.	0.075000	81
82	E 4	24..	0.072917	82
83	F@4	26...	0.072115	83
84	F 4	14	0.071429	84
85	F#4	21.	0.071429	85
86	FX4	25..	0.070000	86
87	G@4	27...	0.069444	87
88	G 4	22.	0.068182	88
89	G#4	26..	0.067308	89
90	GX4	28...	0.066964	90
91	A@4	15	0.066667	91
92	A 4	23.	0.065217	92
93	A#4	27..	0.064815	93
94	AX4	29...	0.064655	94
95	B@4	24.	0.062500	95
96	B 4	16	0.062500	96
97	C@5	30...	0.062500	97
98	C 5	28..	0.062500	98
99	C#5	31...	0.060484	99
100	CX5	29..	0.060345	100
101	D@5	25.	0.060000	101
102	D 5	17	0.058824	102
103	D#5	32...	0.058594	103
104	DX5	30..	0.058333	104
105	E@5	26.	0.057692	105
106	E 5	33...	0.056818	106
107	F@5	31..	0.056452	107
108	F 5	18	0.055556	108
109	F#5	27.	0.055556	109
110	FX5	34...	0.055147	110
111	G@5	32..	0.054687	111
112	G 5	35...	0.053571	112
113	G#5	28.	0.053571	113
114	GX5	33..	0.053030	114
115	A@5	19	0.052632	115
116	A 5	36...	0.052083	116

117	A#5	29.	0.051724	117
118	AX5	34..	0.051471	118
119	B@5	37...	0.050676	119
120	B 5	35..	0.050000	120
121	C@6	30.	0.050000	121
122	C 6	20	0.050000	122
123	C#6	38...	0.049342	123
124	CX6	36..	0.048611	124
125	D@6	31.	0.048387	125
126	D 6	39...	0.048077	126
127	D#6	21	0.047619	127
128	DX6	37..	0.047297	128
129	E@6	32.	0.046875	129
130	E 6	40...	0.046875	130
131	F@6	38..	0.046053	131
132	F 6	41...	0.045732	132
133	F#6	22	0.045455	133
134	FX6	33.	0.045455	134
135	G@6	39..	0.044872	135
136	G 6	42...	0.044643	136
137	G#6	34.	0.044118	137
138	GX6	40..	0.043750	138
139	A@6	43...	0.043605	139
140	A 6	23	0.043478	140
141	A#6	35.	0.042857	141
142	AX6	41..	0.042683	142
143	B@6	44...	0.042614	143
144	B 6	36.	0.041667	144
145	C@7	24	0.041667	145
146	C 7	42..	0.041667	146
147	C#7	45...	0.041667	147
148	CX7	46...	0.040761	148
149	D@7	43..	0.040698	149
150	D 7	37.	0.040541	150
151	D#7	25	0.040000	151
152	DX7	47...	0.039894	152
153	E@7	44..	0.039773	153
154	E 7	38.	0.039474	154
155	F@7	48...	0.039062	155
156	F 7	45..	0.038889	156
157	F#7	26	0.038462	157
158	FX7	39.	0.038462	158
159	G@7	49...	0.038265	159
160	G 7	46..	0.038043	160
161	G#7	50...	0.037500	161
162	GX7	40.	0.037500	162
163	A@7	47..	0.037234	163
164	A 7	27	0.037037	164
165	A#7	51...	0.036765	165
166	AX7	41.	0.036585	166
167	B@7	48..	0.036458	167
168	B 7	52...	0.036058	168
169	C@8	49..	0.035714	169
170	C 8	42.	0.035714	170
171	C#8	28	0.035714	171
172	CX8	53...	0.035377	172
173	D@8	50..	0.035000	173
174	D 8	43.	0.034884	174
175	D#8	54...	0.034722	175
176	DX8	29	0.034483	176

177	E@8	51..	0.034314	177
178	E 8	44.	0.034091	178
179	F@8	55...	0.034091	179
180	F 8	52..	0.033654	180
181	F#8	56...	0.033482	181
182	FX8	30	0.033333	182
183	G@8	45.	0.033333	183
184	G 8	53..	0.033019	184
185	G#8	57...	0.032895	185
186	GX8	46.	0.032609	186
187	A@8	54..	0.032407	187
188	A 8	58...	0.032328	188
189	A#8	31	0.032258	189
190	AX8	47.	0.031915	190
191	B@8	55..	0.031818	191
192	B 8	59...	0.031780	192
193		60...	0.031250	193
194		56..	0.031250	194
195		48.	0.031250	195
196		32	0.031250	196
197		61...	0.030738	197
198		57..	0.030702	198
199		49.	0.030612	199
200		33	0.030303	200
201		62...	0.030242	201
202		58..	0.030172	202
203		50.	0.030000	203
204		63...	0.029762	204
205		59..	0.029661	205
206		51.	0.029412	206
207		34	0.029412	207
208		64...	0.029297	208
209		60..	0.029167	209
210		52.	0.028846	210
211		61..	0.028689	211
212		35	0.028571	212
213		53.	0.028302	213
214		62..	0.028226	214
215		54.	0.027778	215
216		36	0.027778	216
217		63..	0.027778	217
218		64..	0.027344	218
219		55.	0.027273	219
220		37	0.027027	220
221		56.	0.026786	221
222		38	0.026316	222
223		57.	0.026316	223
224		58.	0.025862	224
225		39	0.025641	225
226		59.	0.025424	226
227		60.	0.025000	227
228		40	0.025000	228
229		61.	0.024590	229
230		41	0.024390	230
231		62.	0.024194	231
232		42	0.023810	232
233		63.	0.023810	233
234		64.	0.023437	234
235		43	0.023256	235
236		44	0.022727	236

237	45	0.022222	237
238	46	0.021739	238
239	47	0.021277	239
240	48	0.020833	240
241	49	0.020408	241
242	50	0.020000	242
243	51	0.019608	243
244	52	0.019231	244
245	53	0.018868	245
246	54	0.018519	246
247	55	0.018182	247
248	56	0.017857	248
249	57	0.017544	249
250	58	0.017241	250
251	59	0.016949	251
252	60	0.016667	252
253	61	0.016393	253
254	62	0.016129	254
255	63	0.015873	255
256	64	0.015625	256

SOURCE PROGRAM

CHAINING PROCEDURE:

name: SHAPE

programs to be kept on disc: MAIN, DADA

1) TOT3, VIEW, ZARRAY

2) HIST1

3) TIME2

4) FILE2

1:2:3:4