
- UAA -
|
- Stop -

Composer / researcher:

Dimitri Voudouris
[1961*]

Annum:

2010 - 2012

Duration:

127 min 03 sec <

Composition:

KODERING

P1

Kode 01	Kode 02	Kode 03	Kode 04	Kode 05	Kode 06	Kode 07
Kode 08	Kode 09	Kode 10	Kode 11	Kode 12a	Kode 12b	Kode 13a
Kode 13b	Kode 13c	Kode 14a	Kode 14b	Kode 14b	Kode 15a	Kode 15b
Kode 16a	Kode 16b	Kode 16c				

P2

Kode 17a	Kode 17b	Kode 17c	Kode 18	Kode 19	Kode 20	Kode 21a
Kode 21b	Kode 21c	Kode 22a	Kode 22b	Kode 22c	Kode 22d	Kode 23a
Kode 23b	Kode 23c	Kode 23d	Kode 24a	Kode 24b	Kode 24c	Kode 25a
Kode 25b	Kode 25c	Kode 25d	Kode 25e	Kode 26a	Kode 26b	Kode 27a
Kode 27b	Kode 27c	Kode 28a	Kode 28b	Kode 28c	Kode 28d	Kode 29a
Kode 29b	Kode 29c	Kode 29d	Kode 30a	Kode 30b	Kode 30c	Kode 30d
Kode 31a	Kode 31b	Kode 31c	Kode 32a	Kode 32b		

P3

Kode 33a	Kode 33b	Kode 34a	Kode 34b	Kode 35a	Kode 35b	Kode 35c
Kode 35d	Kode 35e	Kode 36a	Kode 36b	Kode 36c	Kode 37	Kode 38a
Kode 38b	Kode 38c	Kode 39a	Kode 39b	Kode 39c	Kode 39d	Kode 39e
Kode 39f	Kode 39g	Kode 40a	Kode 40b	Kode 40c	Kode 40d	Kode 40e
Kode 40f	Kode 41a	Kode 41b	Kode 42a	Kode 42b	Kode 42c	Kode 42d
Kode 42e	Kode 42f	Kode 43	Kode 44a	Kode 44b	Kode 45a	Kode 45b
Kode 45c	Kode 46	Kode 47a	Kode 47b	Kode 48a	Kode 48b	Kode 48c

P4

Kode 49a	Kode 49b	Kode 49c	Kode 49d	Kode 50a	Kode 50b	Kode 50c
Kode 50d	Kode 50e	Kode 50f	Kode 51a	Kode 51b	Kode 51c	Kode 51d
Kode 51e	Kode 52a	Kode 52b	Kode 52c	Kode 52d	Kode 52e	Kode 52f
Kode 52g	Kode 52h	Kode 53a	Kode 53b	Kode 53c	Kode 53d	Kode 54a
Kode 54b	Kode 55a	Kode 55b	Kode 55c	Kode 56a	Kode 56b	Kode 56c
Kode 56d	Kode 57a	Kode 57b	Kode 57c	Kode 58a	Kode 58b	Kode 58c
Kode 58d	Kode 58e	Kode 58f	Kode 59a	Kode 59b	Kode 59c	Kode 59d
Kode 59e	Kode 60a	Kode 60b	Kode 60c	Kode 60d	Kode 61a	Kode 61b
Kode 61c	Kode 61e					

| Kode 1 – Kode 21c | was commissioned by

piano

Genetic code and Gene-Protein Relations

The base sequence of a gene is colinear with the amino acid sequence of its polypeptide product. The genetic code is a relationship between the sequence of bases in DNA (or its RNA transcript) and the sequence of amino acids in proteins. Amino acids are coded by groups of three bases (called codons) starting from a fixed point. Sixty-one of the sixty-four codons specify particular amino acids, whereas the other three codons (UAA, UAG and UGA) are signals for chain termination. For most amino acids there is more than one code word. The code is degenerate i.e. there more than one code word for most of the amino acids. The degeneracy is in the third position of the codon the third position (nucleotide) is much less specific than the first and second position. Codons specifying the same amino acid are called synonyms. Most synonyms differ only in the last base of the triplet.

Composition

Kodering are miniature piano studies derived from the genetic code. Out of sixty-four codons three sections P1, P2, P3, P4 [each section is made up of sixteen codons] were deciphered and interpreted into th e score. Selections for performance are made in sequential order or by a random process either by the pianist, video projectionist and audience.

Fig 1: Thirty-two codons

First position		Second	position		Third position
	U	C	A	G	
U	uuu	uuc	uua	uug	U
	ucu	ucc	uca	ucg	C
	uau	uac	uaa	uag	A
	ugu	ugc	uga	ugg	G
C	cuu	cuc	cua	cug	U
	ccu	ccc	cca	ccg	C
	cau	cac	caa	cag	A
	cgu	cgc	cga	cgg	G

Formations of codon triplets occur in random fashion. The codon in amino acid formation should be seen in triplets generating a coded message as in fig:1 above. The treatment of each triplet was regarded as a unique cell functioning independently. Codon cell positions have been allocated specific notes, pitch, dynamics and note velocity specifications. UAA, UGA and UAG are codons that signal chain termination and are used strategically in the work to reflect micro moments of silence.

- G -	copolymer
- UGG -	Triplet codon

Kode 01	**UUU**	Kode 11	**UGU**	Kode 16a	**CUA**	Kode 21b	**CCG**
Kode 02	**UCU**	Kode 12a	**UGC**	Kode 16b	**CUA**	Kode 21c	**CCG**
Kode 03	**UUA**	Kode 12b	**UGC**	Kode 16c	**CUA**		
Kode 04	**UUG**	Kode 13a	**UGG**	Kode 17a	**CUG**		
Kode 05	**UCU**	Kode 13b	**UGG**	Kode 17b	**CUG**		
Kode 06	**UCC**	Kode 13c	**UGG**	Kode 17c	**CUG**		
Kode 07	**UCA**	Kode 14a	**CUU**	Kode 18	**CCU**		
Kode 08	**UCG**	Kode 14b	**CUU**	Kode 19	**CCC**		
Kode 09	**UAU**	Kode 15a	**CUC**	Kode 20	**CCA**		
Kode 10	**UAC**	Kode 15b	**CUC**	Kode 21a	**CCG**		

Fig: 2 Kode to codon linking in KODERING

Duration

The duration of the Kodering can last for the specified time or could last an indefinite time span according to the random process of section selection.

Code in chains – positioning – note specifications

Ten chains and a total of 8 positions determine the possibility of assigning each UAU in a chain to a specific set of notes. fig 3 shows how UAU in chain 1 would be assigned to note D and A.

CHAIN POSITION	1	2	3	4	5	6	7	8
1	**UAU**	CUA	UCU	AUC	**UAU**	CUA	UCU	AUC
2	**UAU**	**UAU**	CUA	UCU	AUC	CUA	AUC	UCU
3	CUA	**UAU**	UCU	AUC	CUA	UCU	AUC	**UAU**
4	**UAU**	CUA	UCU	**UAU**	AUC	CUA	UCU	AUC
5	CUA	**UAU**	UCU	AUC	CUA	UCU	AUC	**UAU**
6	**UAU**	CUA	**UAU**	UCU	AUC	CUA	UCU	AUC
7	CUA	UCU	**UAU**	**UAU**	AUC	CUA	UCU	AUC
8	CUA	UCU	UCU	AUC	CUA	UCU	**UAU**	**UAU**
9	CUA	UCU	AUC	CUA	**UAU**	UCU	**UAU**	AUC
10	CUA	UCU	AUC	**UAU**	CUA	**UAU**	UCU	AUC
	|	|	|	|	|	|	|	|
Notes	**D**	**E**	**F**	**G**	**A**	**B**	**C**	**D**

Fig: 3 Codon positioning and note linking

The three examples illustrated below are part one of forty-eight coded possibilities in the first set of triplet codes determined [considering the evaluation of pitch, note velocity / note length and dynamics in the score] by applying strict principles of elementary probability theory.

Fig : 4 - Codon - dynamic evaluation

dynamics	Q1	Q2	Q3	average totals
uuu	35	50	80	55
uuc	35	50	40	41.7 - 42
uua	35	50	98	61
uug	35	50	60	48.3 - 48
ucu	35	72	80	62.3 - 62
ucc	35	72	40	49
uca	35	72	98	68.3 - 68
ucg	35	72	60	55.7 - 56
uau	35	68	80	61
uac	35	68	40	47.7 - 48
uaa	35	68	98	67
uag	35	68	60	54.3 - 54
ugu	35	50	80	55
ugc	35	50	40	41.7 - 42
uga	35	50	98	59.3 - 59
ugg	35	50	60	48.3 - 48

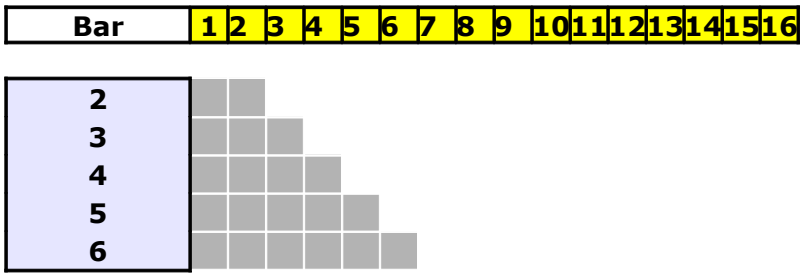
Q1 – Q3 are copolymer positions, the copolymer position determines the dynamic value [*p, mf, ff, zf*] when changing the position of copolymer this determines a different dynamic value, the average value is determined by the sum of the coded values divided by 3. When a similar triplet codon appears -UUU-UUU-UUU-UUU- in one to four positions the four codons are treated as clusters of similar dynamic intensity, the dynamic patterns of four codon clusters would not exceed 55db. If the clusters occur of different codons the sum of the clusters divided by the number of codons would be the estimated dynamic volume.

Fig : 5 - Codon – note length evaluation

a]

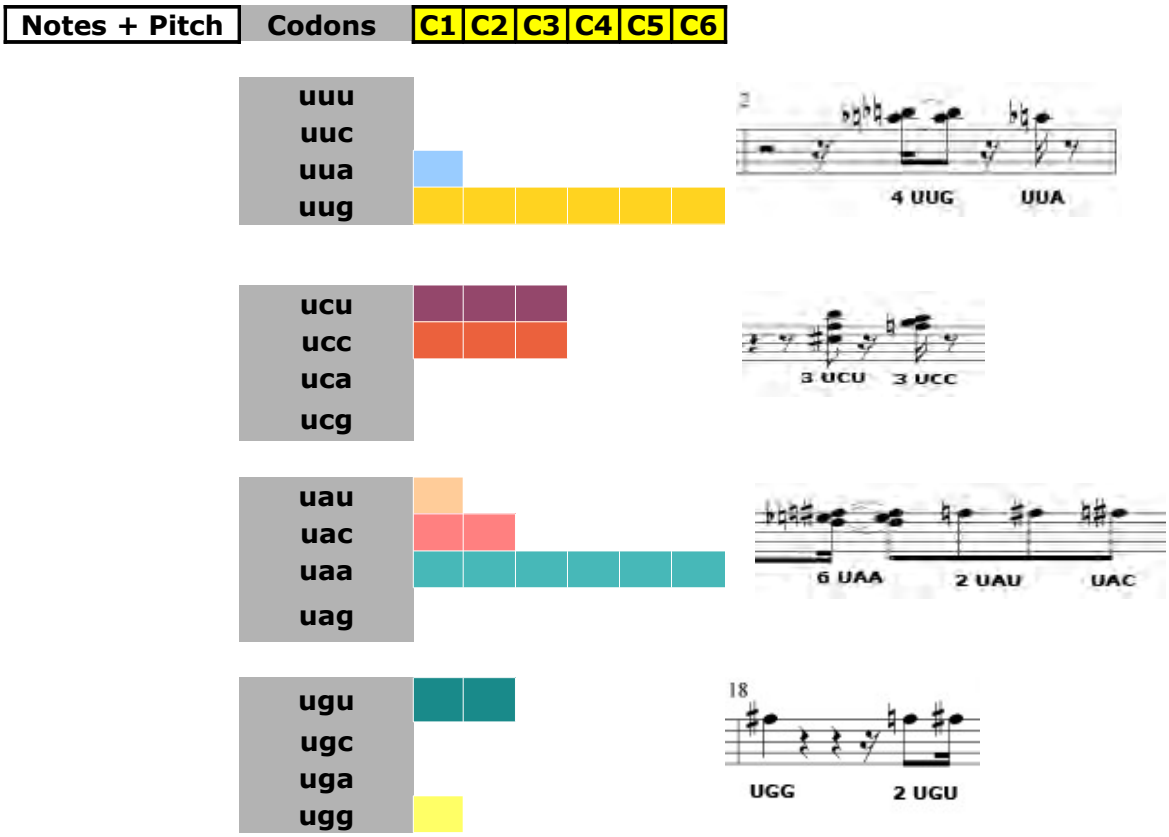
Note length	Q1	Q2	Q3	average totals	rounded to:
uuu	1	3	2	2	2
uuc	1	3	4	2.7	3
uua	1	3	3	2.3	2
uug	1	3	7	3.7	4
ucu	1	6	2	3	3
ucc	1	6	4	3.7	4
uca	1	6	3	3.3	3
ucg	1	6	7	4.7	5
uau	1	5	2	2.7	3
uac	1	5	4	3.3	3
uaa	1	5	3	3	3
uag	1	5	7	4.3	4
ugu	1	9	2	4	4
ugc	1	9	4	4.7	5
uga	1	9	3	4.3	4
ugg	1	9	7	5.7	6

b]



The sum of the triplet codes in three positions e.g. -u-g-u, are divided by three the results obtained are reflected in the last column [total values]. The values are directly proportional to the position of the copolymer e.g. Q1, Q2, Q3.
In fig 5 b the graph shows the lengths of the triplet codes determined by rounded values obtained from fig 5 a.

Fig : 6 - Codon – pitch / note [generation through codon mutation]



Mutations are produced by changes in the base sequence. 1] The substitution of one base pair for another or of several pairs. 2] Deletion of one or more base pairs. 3] Insertion of one or more base pairs. The example in fig: 7 below shows; 2 UGU codons generate 1 UGG codon and visa versa. The same applies to the other examples given above.

Mutation	a	Reversions	b
to		from	
	UG**A**		U**C**U
UGU	U**G**G	UGU	U**A**U
	CGU		U**U**U
			CGU
			AGU
			GGU
			UG**A**
			UG**C**

Fig:7

Note generation is only possible from the codes reflected in fig: 6 e.g. -UGG- is translated into a quarter note and that generates 2 -UGU- into 2 sixteenth notes in the same position F this possibility is reversible.

[1] -6 – UUU – generates -1 – UUA – similarly -1 – UUA – generate -6 – UUU –.
[2] - 3 – UCC – generate – 3 – UCU – similarly – 3 – UCU – generate - 3 – UCC –.
[3] – 6 – UAA – generate – 2 – UAC – / – 1 – UAU – similarly– 6 – UAA – generate – 1 – UAU – / – 2 – UAC –, - 2 – UAC – generate – 6 – UAA – / – 1 – UAU – or – 2 – UAC – / generate – 1 – UAU – / – 6 – UAA –, – 1 – UAU – generate – 6 – UAA – / – 2 – UAC – or – 1 – UAU – generate – 2 – UAC – / – 6 – UAA –.
[4] – 1 – UGG – generate – 2- UGU – similarly – 2 – UGU generate – 1 UGG -.

Selections were made from results working both ways.

Performance

Psychological aspects of Reinforcement Value and Response Strength

The operant response rate can be sensitively changed by parameters of reinforcement (such as frequency, density, magnitude and immediacy), by the temporal distribution (proximity) of reinforcements, by the definition of the response and by explicit contingencies. Even though behaviour can be a function of many variables, not all high probability behaviours seem to represent “strong” behaviours. Strong behaviour is equated with strongly motivated behaviour, similarly a behaviour is strong when its maintaining reinforcer is very powerful. Conversely, in this scheme, a behaviour tendency is weak when its reinforcement is weak. These equations imply that to quantify response strength in any given situation, the reinforcement strength needs to be measured. This is possible, knowing the amount of parameters of reinforcement possess a unity of function in the similar way that they affect behaviour, in their functional ex-changeability within themselves, and in their relative independence from the other variables of which behaviour is a function.

a] Without a visual component

fig: 8 - The initiator here is the audience having not heard the music before they make random decisions of what should be performed the pianist is basically executing their selections so that the delay time in [reinforcement and response] selecting lies with the audience, group leaders and person [A]. The pianist is allowed to make a decision when all six selections are presented and the selections are chosen randomly or in sequence, the delay time lies both with the audience, group leaders, the person [A] and the pianist.

1.1] Choosing a section to perform

1] When presented with the score it will be performed in its entirity. A section can be selected and performance can be repeated at lib.

1.2] Role of audience in selection

1] The audience is divided into six groups.
2] Each group has a leader with numbered signs [1-32].
3] Track selection *via signs* is done by the audience and presented to the group leader.
4] If more than one number is selected by the audience, the group leader has to add all the numbers together and divide the by the unit numbers presented to him.
5] He selects a sign and presents the calculated reading [if answer is 8.6 → he rounds it of to the nearest whole number, in this case the answer would be 9, 8.5 → the choice of selection is with the group leader, the answer is either 8 or 9] to the stage.
6] The individual [A] collects all the necessary data from the leaders of the six groups calculates the result by adding the six readings together and then dividing by six [8.6 → the rounded answer would be 9 etc].
7] [A] presents the reading to the pianist [P].
8] Alternately [A] collects the six readings from the group leaders and presents all six results to the pianist [P] who intern plays the selected numbers in the sequence or randomly.
9] The duration of the tracks are given to the audience e.g. 1 | Kode1 | 1 min.
10] All selections are to be made prior to the end of the performed section.
11] [A] places the track/s been played on a stand facing the audience, on a circular stage a selected member from the audience walks around the stage and makes sure the number/s of the track/s [1-32] performed are clearly seen by the audience.

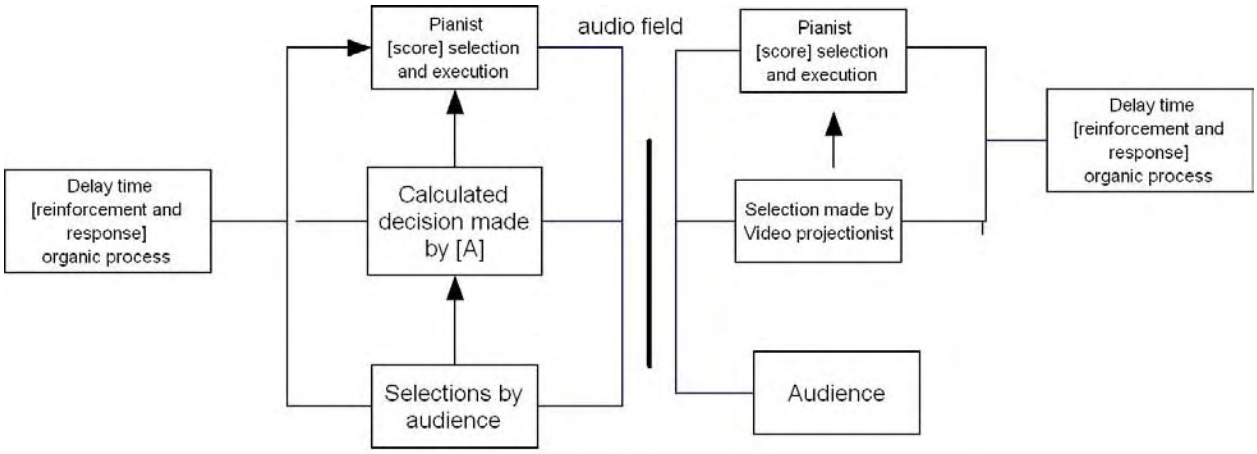


Fig 8 - Process

1.3] Bar selection

1] E.g. from [Kode1] a minimum of three and maximum of six bars can be selected and introduced into a different section [Kode13a] and visa versa.
2] The delay time would lie with the audience, group leaders, person [A] and the pianist.

1.4] Tracking delay time

1] Person [C] is assigned the job of tracking delay time in both sections.
2] The time will be tracked from the point of reinforcement to the point of response.
3] To have a true reflection of procedures in the two sections it is important that the data collected should be kept separate.
fig: 9
4a] The data collected will be presented to the composer who will incorporate the results from various performances into the next composition.
4b] Depending in what section the data was collected, this will be used to incorporate silence and also note velocity changes in the next composition.
5] In the first section the helper to the group leader has a stopwatch and two signs indicating stop and go when he/she get a signal from the group leader to commence he raises the go sign waits for 15 sec and then raises the stop sign to the audience 15 sec is the time given for track selection he does not switch the stopwatch off until the group leader has done the necessary calculations and is ready to submit to [A] in the next section.
6] In the second section the helper sets his stop watch on from the point of receiving the figures from all six sections, calculating the results, presenting the results to the pianist and awaiting execution.

1.5] Repeated track numbers

1] The group leader records the numbers he collects.
2] After he/she has made his calculations and the same track number [if more than two occasions] happens to reoccur he/she will either not pass the calculated number or with a

warning pass the number a head [using a white sign] to [A].
3] If he/she chooses not to pass the calculated number to [A] he will do the following:
a] He/she will reject the calculated number or place it asside to be used at a later occasion.
b] He/she will re-look at the past recorded numbers, in vertical calculations and proceed to make horizontal calculations [orange/green columns below fig: 8.1].

recordings	1	2	3	4	5		
						total	Nett result
1	3	3	24	29	10	69	14
2	30	30	19	17	12	108	22
3	4	7	11	13	12	47	8
4	7	14	12	9	12	54	11
5	14	4	9	10	13	50	10
total	58	58	75	78	59		
Nett result	12	12	15	16	12		

Fig: 8.1 – an example of recorded and calculated results by the group leader

c] When the group leader is satisfied with the new result it will be passed on [with a red sign] to [A].
4] A new number presentation by the audience has to reoccur if the nett results in both vertical and horizontal positions are the same.
5] Similar calculations are done by [A] as in fig: 8.1 that is if the numbers are similar and have been presented to the pianist on two prior occasions.

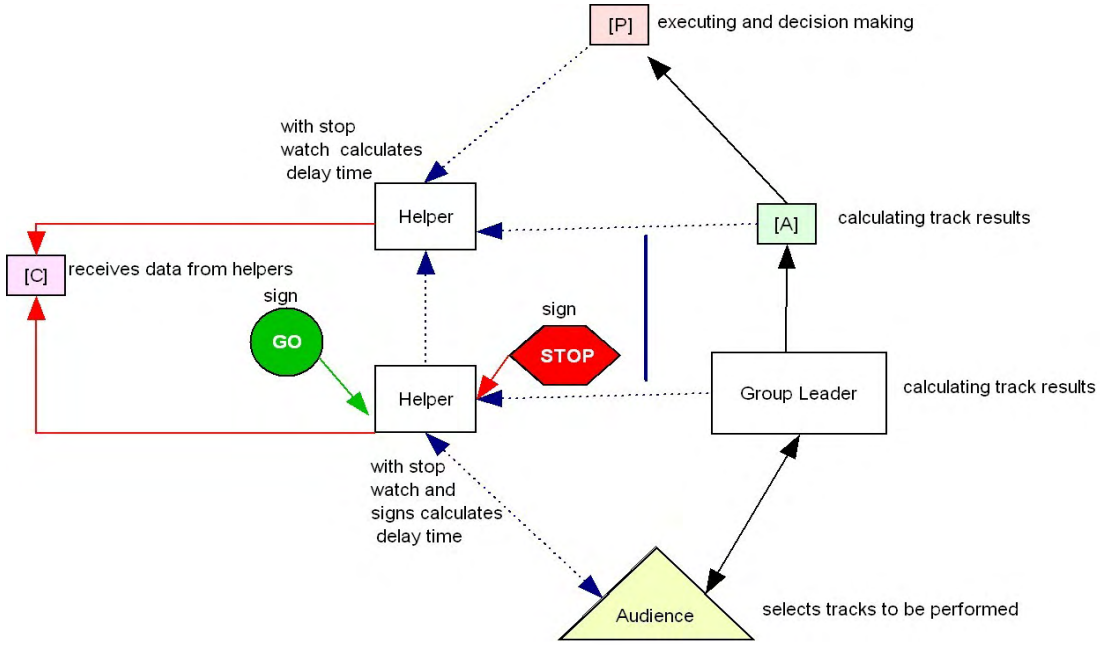


Fig: 9 - [without visual component] Role of helper

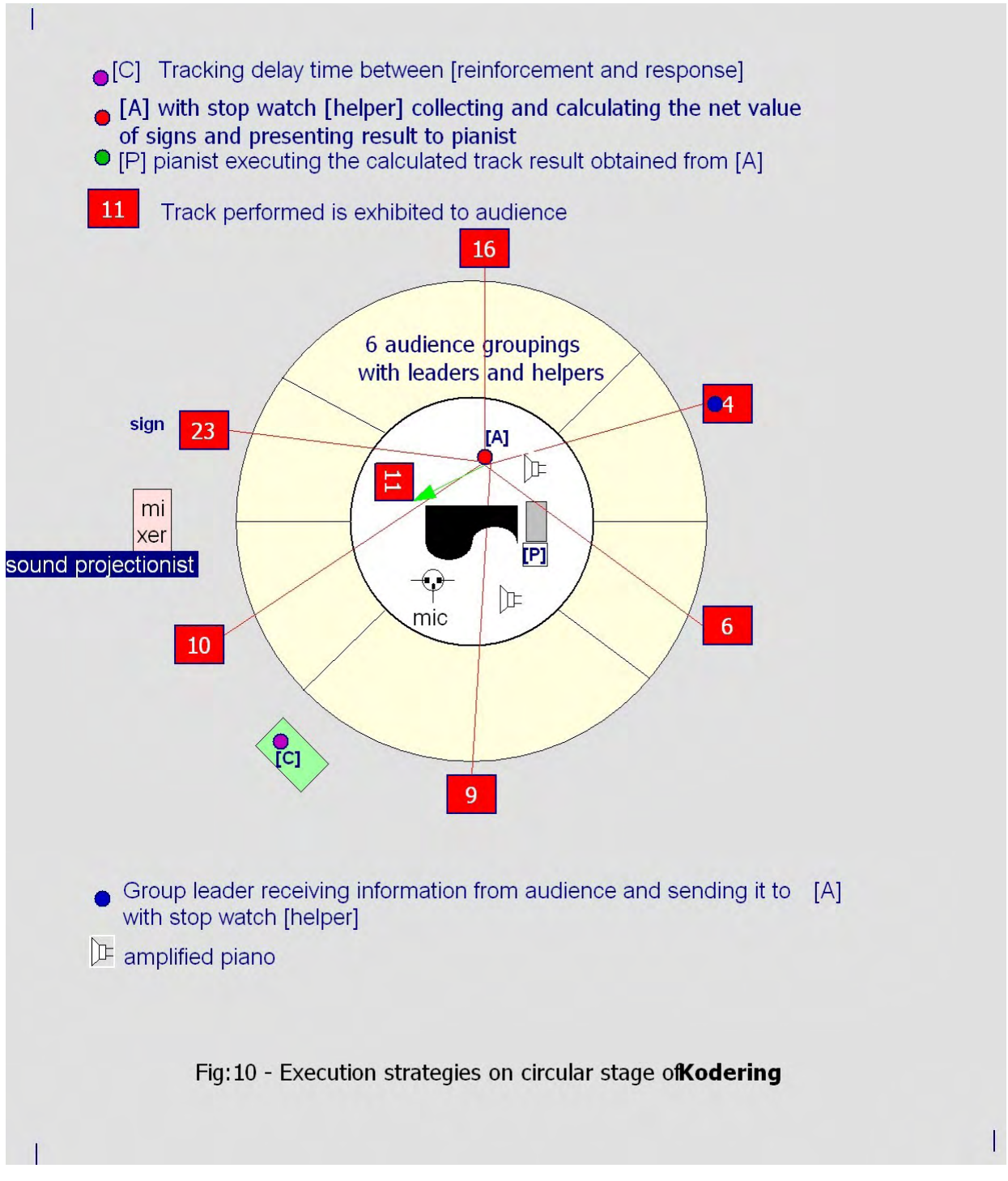


Fig:10 - Execution strategies on circular stage of **Kodering**

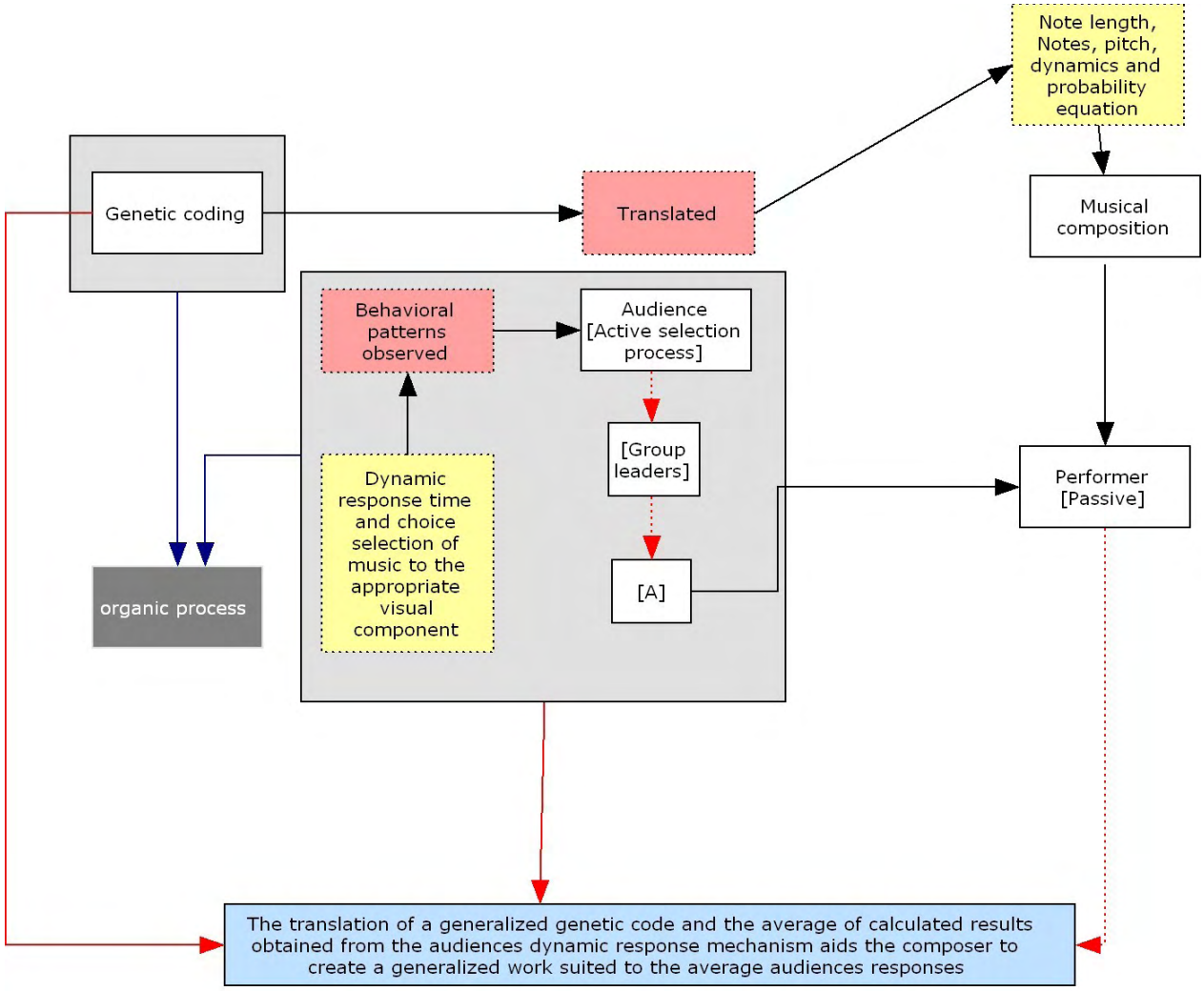


Fig: 11 - Aim of performance in the process of live communication

b] With a visual component

fig: 8 - The initiator here is the video projectionist, who's familiarity with the score and visual component helps him to reinforce the projection of the visual component spontaneously to the pianist who is only familiar with the score and makes random decisions of what to play in accordance with the visual projection, so the delay time in [reinforcement and response] selection and execution lies to a lesser extent with the visual projectionist than with the pianist.

1] The video projectionist selects visual material and displays his selection on a screen situated in front of the audience and pianist.
2] The pianist then selects sections of Kodering and performs them in accordance with the visual material displayed.
3] Selections and extractions are made randomly.
4] **Note** the video projectionist and pianist are to perform the score presented in its entirity.

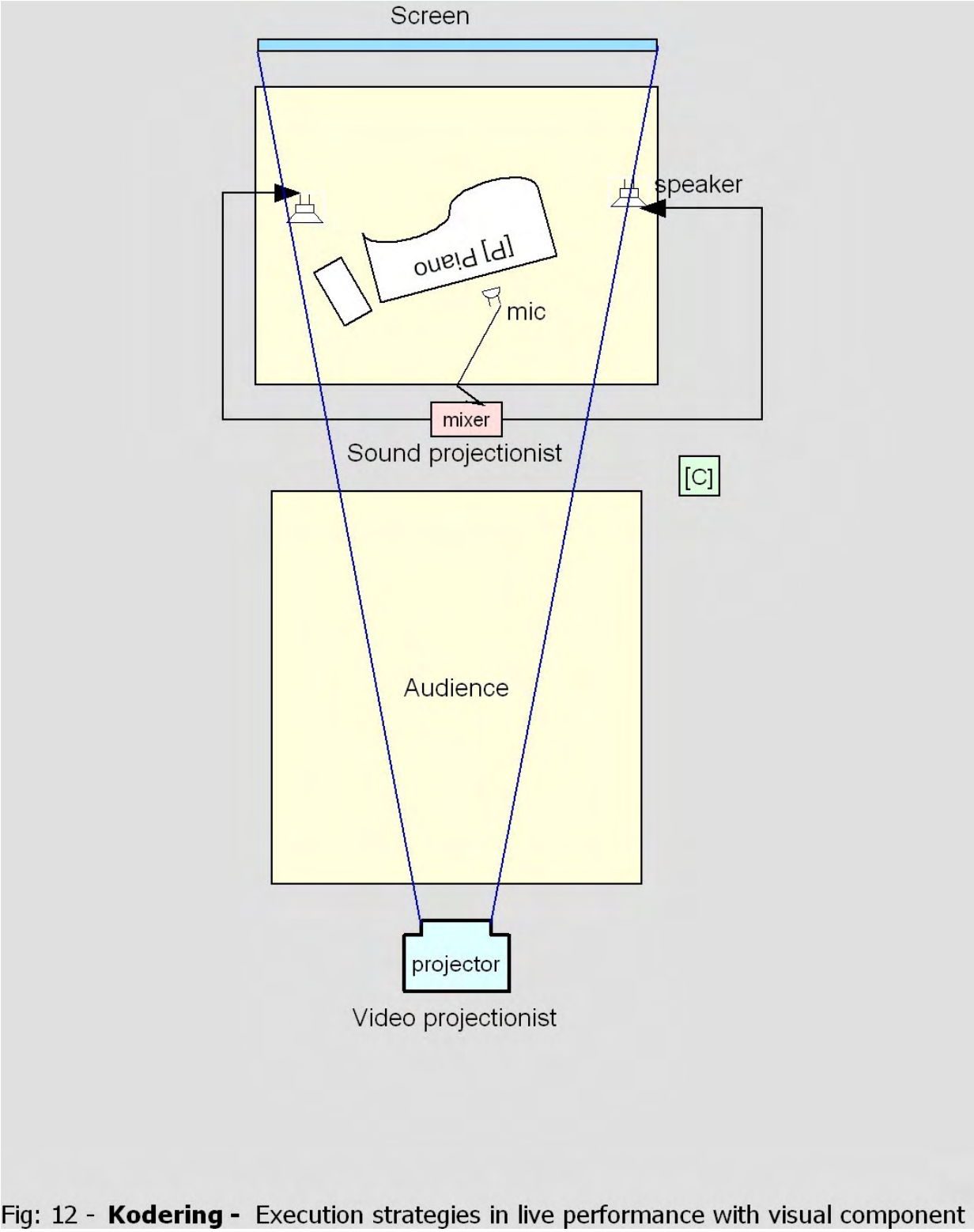


Fig: 12 - **Kodering -** Execution strategies in live performance with visual component

1.1] Tracking delay time

fig: 12

1] The time between the point of reinforcement [video projectionist] and response [pianist] is noted by [C] with two stop watches.

2] [C] has two options:

a] To familiarize his/her self with video/audio footage prior to the performance.

b] To video clip the performance in each way he/she feels fit.

3] The video and audio clips will be marked on a spread sheet:

a] The only time a marking is allocated of the 32 chances is when the audio material matches the video clip.

4] Stopwatch [SW1] is linked to the actions of video projectionist and [SW2] to the actions of the pianist.

5] [SW2] the stopwatch stays on from:

a] The start of video projection to the start of playing.

b] If a mistake is encountered by the pianist who *stops starts* the procedure the time delay must be noted by [C].

6] [SW1] the stopwatch stays on from the point of selection to the point of projection.

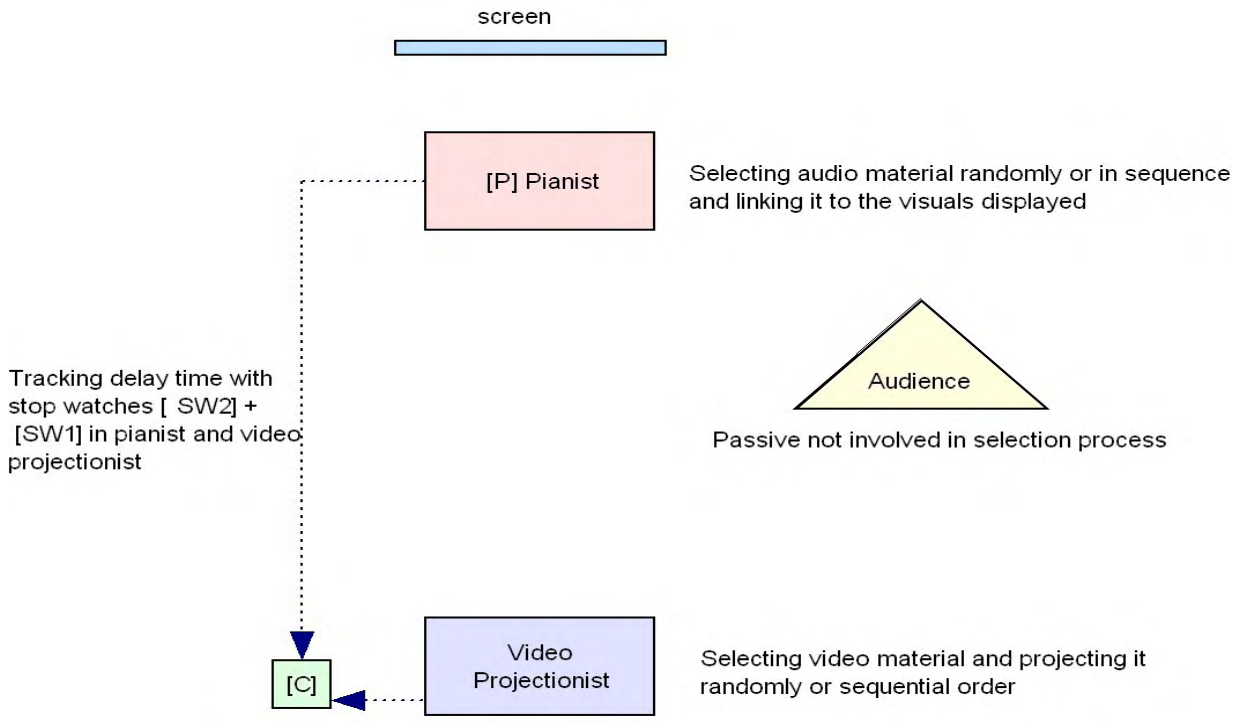


Fig: 13 [with video component] Role of [C]

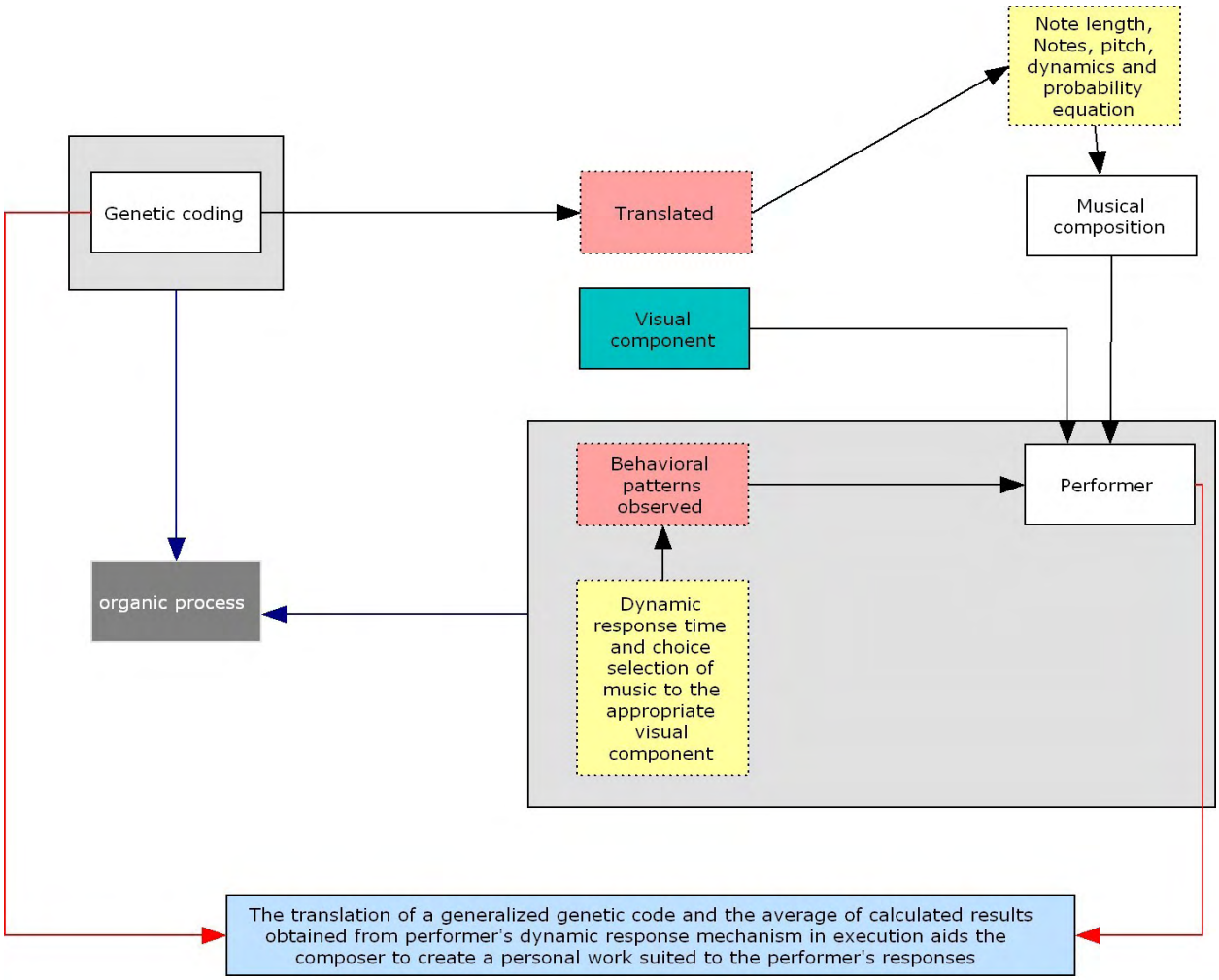


Fig: 14 - Aim of performance in the process of live communication

c] All 4 Parts of Kodering – P1-P4 are performed at the same time by 4 pianists

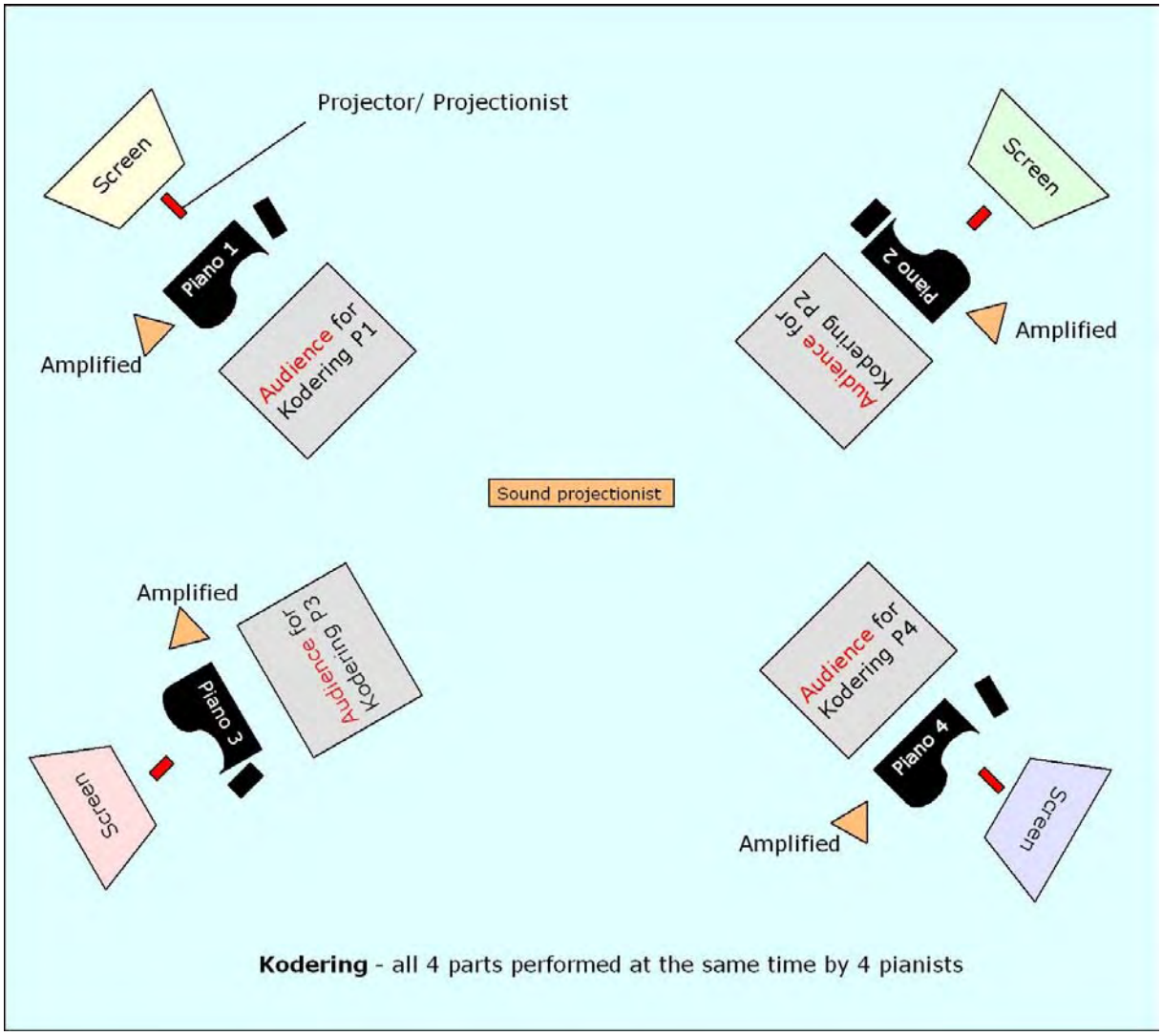


Fig: 15

All four pianists and projectionist/s operate as in Fig:12.

1] The video projectionist selects visual material and displays his selection on a screen situated in front of the audience and pianist.
2] The pianist then selects sections of Kodering and performs them in accordance with the visual material displayed.
3] Selections and extractions are made randomly.
4] **Note** the video projectionist and pianist are to perform the score presented in its entirity.

Similarly all four pianists would perform their tasks as in **a]**.

Sound projectionist

The amplified sound should be balanced according to the acoustics of the performance space.

In Conclusion

With a visual component – a passive audience selection process, the procedures above track the time [sec] taken for an audio result to occur, a near perfect synchronous match between audio and video material and the behavioural patterns noted by the pianist, will guide the composer to produce work in a close match to the pianist's capabilities. ***Without a visual component -*** the score selections to be played are chosen primarily by the active audience, the tracked time/s [sec] and noted behavioural patterns collected from the audience, group leaders and person [A] will guide the composer to produce a work matching the recorded results. This depends entirely on the relationship between the strength of the reinforcement and response values.

References

1] Stanfield – Genetics – pg 30-46, code – 070-608423
2] Lipschutz – Probability – code – 070 – 37982-3
3] Murray,Spiegel – Statistics in SI units - pg 141-155 code - 070-843391
4] Stryer – Biochemistry – The Genetic code and Gene protein Relations, pg 619-639