

Paper presented at the conference Art-oriented programming 2 (Programmation orientée-art 2) at the Amphithéâtre Richelieu of the Sorbonne, Paris, 20th October 2007.

Published at the Art++, David-Olivier Lartigaud (ed.), Editions HYX (Architecture-Art contemporain-Cultures numériques), Orléans, 2011, pp. 26 - 39.

## Notions of the Program in 1960s Art

### – Concrete, Computer-generated and Conceptual Art

#### case study: New Tendencies

#### Darko Fritz

Several tendencies of art of 1960s that are at the first sight completely different and excluding each other can be viewed throughout the notions of the program. The first discourse toward the notion of the program in art we can find in Concrete / Neo-constructivistic / Luminokinetic art and alike, second discourse in Computer-generated art and third in Conceptual art. At the time being in 1960s almost no communication was established between mentioned three ways of artistic practices and related theories. Very few exhibitions were presented those kinds of works together back in the time of its production.

During the late 1950's and early 1960s group of artists start to resist the notion of individual artists' expressions of than-dominated *informel* and *abstract expressionism*. The new approach was rational art that appropriated scientific working methods and start to employ new technologies, materials and methods in art practice. Discourse in art changed: artists shift to researchers or workers; intuitive art process shift to rational structuralized experiment following the terminated program; paintings and sculptures shift to objects, multiples and installations often using light as material; an individual artist creation shift to the subject of group work and art groups itself shift to interdisciplinary teams.

Recognizing such activities around the world an umbrella network was established in Zagreb, Croatia in 1961 that presented pluralistic scene of such art practices. The Gallery of Contemporary Art organized five New Tendencies [NT] exhibitions in Zagreb from 1961 to 1973; in addition, large-scale international exhibitions were held in Paris, Venice and Leverkusen, West Germany. The movement was truly international, both transgressing Cold War blocs and including South American and, later, Asian artists. That situation, unique within the Cold War context, was possible due to Zagreb's position in then-socialist but non-aligned Yugoslavia. From 1961 to 1965 New Tendencies both stood for a kind of art and acted as an umbrella network for approximately 250 artists, critics and art groups<sup>1</sup>. The latter included among others Groupe de Recherche d'Art Visuel (GRAV) of France; Equipo 57 of Spain; Gruppo N, Gruppo T, MID, Gruppo 63, Operativo R and Azimuth of Italy; Zero of Germany; Anonima Group of the U.S.A.; and Dviženije of the U.S.S.R.). With an emphasis toward providing a scientific dimension to art, NT from the very beginning focused on experiments on visual perception based on Gestalt theory and different aspects of "rational" art: *arte programmata*, lumino-kinetic art, *gestalt kunst*, neo-constructivist and Concrete art and the like; later it was given the collective name of NT or simply *visual research*.

In the beginning and mid 1960s a new practice of Computer art appears mostly from the scientific establishment<sup>2</sup>. Despite the fact that artist of the NT 'rational art' were theoretically equipped and already using machines in their work, actually very few of them start to use computers in their work. In the later phase of the movement (1968-1973) Tendencies dropped

---

<sup>1</sup> On the New Tendency movement, see Jerko Denegri, "Umjetnost konstruktivnog pristupa" (Zagreb: Horetzky, 2000). For information on Bonačić, see pp. 490--497. Published in English as "The Constructive Approach to Art: Exat 51 and New Tendencies" (Zagreb: Horetzky, 2004).

<sup>2</sup> Only computation as the time was possible at big mainframe computers that only military, scientific, big business and university establishmet had in possession. The posibility that artists access the equipment for free art production vary form the specific sociopolitical situation at different countries.

“New” from its title and made it plural. Over that period a second wave of 58 artists and groups exhibited computer-generated works, and finally in 1973 Tendencies presented, alongside the first phase of NT visual research, this second grouping of computer-based visual research and finally conceptual art as well<sup>3</sup>. The statement of Brazilian artist and active NT participant Waldemar Cordeiro, that computer art had replaced constructivist art<sup>4</sup> can be traced through the history of New tendencies movement, as well as an attempt of the NT organizers to include the conceptual art within its frame in the latest phase of the movement. As such, NT is the unique example in art history that connected and presented those three frames of art under the same roof – being those of Concrete, Computer and Conceptual art.

It is worth looking more closely at the term “programmed art” of the Concrete / Neo-constructivistic / Luminokinetic art and its follow up in the computer-generated art.

Most of the works in the field of NT offered to the observer visual experimental situations in space and time. A large number of the works were only “completed” by the specific standpoint or the manipulation of the viewer. The notion of “program” appears in the early 1960s within the New Tendencies context in different countries: it is f. e. mentioned by the philosopher Umberto Eco, the designer and artist Karl Gerstner<sup>5</sup>, by François Morellet, but also by Ivan Picelj with his 1965 “oeuvre programmé”. The artist Enzo Mari underlined, that even before the advent of the computer „to employ the “program”<sup>6</sup> was characteristic of the work of a number of NT-researchers. In this, the word “program” refers to slightly different ideas. Umberto Eco writes a text on “Arte Programmata” for the catalogue of an exhibition with the same title in Milano in 1962. The exhibition, sponsored by Olivetti, presented works by members of GRAV, Gruppo T and Gruppo N. With reference to the works – “constructions of unmovable structures, which changed with the perspective of the viewer and “kinetic movable structures” Umberto Eco defines a specific class of the “open work”, which he had described in his book *Opera aperta* in the same year. The specific class consists of programmed “event fields”. He writes: “It is possible to program with the linear purity of a mathematical program event fields, in which random processes can happen.” ... “We therefore can talk about programmed art.” Eco focuses on the possibility of the rational construction of a specific situation for the observer. Seven years after writing this text, in 1969 Umberto Eco was a member of the jury of the computer art contest of “Tendencije 4” in Zagreb.

In contrast to Eco, the artist François Morellet makes the aspect of “programming” for the process of artistic creation even more explicit. “Programming” refers to the self-discipline of the artist, that guarantees a rational and traceable procedure and structure that permits “the public to take part in the ‘creation’ of the works”. This helps to “demystify” and democratize art<sup>7</sup>. Morellet writes: “departing from controllable elements” the artist has to follow a program. The development of an experiment should realize itself, almost outside of the programmer.”<sup>8</sup> From the moment he sets up the rules, the artist does not intervene or correct the process.<sup>9</sup>

It seems that Morellet’s definition establish the link between “arte programmata” and “computer art”, and can be as well widely applied to the contemporary generative and software art. The same approach can be applied as well to part of the spectrum of conceptual art practices from 1960s until today.

---

<sup>3</sup> The exhibition “bit international – [New] Tendencies – Computers and Visual Research, Zagreb 1961 - 1973” curated by Darko Fritz presenting all three major waves of NT throughout the prism of the understandings the notion of the program within each respective field of visual arts. Exhibition was held in 2007 in Neue Galerie, Graz, Austria and 22nd Feb. 2008 - 6th Jan 2009 in ZKM Media Museum in Karlsruhe, Germany.

<sup>4</sup> “Constructive art belongs to the past, its contents corresponding to the Paleocibernetic Period being those of the Computer Art.” Waldemar Cordeiro, paper “Analogical and/or Digital Art” read at the “The Rational and Irrational in Visual Research Today / Match of ideas”, symposium t–5, 2 June 1973, Zagreb. Abstract published in the symposium reader, Zagreb: Gallery of Contemporary Art, 1973, n.p.

<sup>5</sup> Karl Gerstner, *Programme Entwerfen. Statt Lösungen für Aufgaben Programme für Lösungen (Designing Programs. Instead of Solutions for Tasks, Programs for Solutions)*, Teufen: Niggli 1963

<sup>6</sup> Enzo Mari, „Nouvel Tendence: Ethique ou Poétique”, in: *Cat. Tendencije 4*, Zagreb: Galerija Suvremene Umjetnosti 1970, n. p.

<sup>7</sup> François Morellet, “Pour une peinture expérimentale programmée”, in: *Groupe de recherche d’art visuel (plaquette)*, Paris: Galerie Denise René et le GRAV 1962, n. p.

<sup>8</sup> “François Morellet, “Pour une peinture expérimentale programmée”, in: *Groupe de recherche d’art visuel (plaquette)*, Paris, Galerie Denise René et le GRAV 1962, n. p.

The computer-generated art of a 1960s was made within limitations of technology of the time, often inventing the new working methods as a primary goal. Such artifacts were rarely labeled as art by the authors. It was rather experiments, similar situation was created when earlier NT artist were labeled their work as “*visual research*”. The difference was that NT artist were fully aware of the art context and their rebellion position at the time that desacralized conventional art vocabulary. Computer scientists that produced most of the early computer-generated art were mostly expressing other kind of creativity that had no label until late 1960s. The software programming languages were not standardized, and different hardware made in small series used particular and not standardized protocols. Works were executed in the forms of computer-generated texts, music, plotter drawings, multiples, photographs, 16mm films, theatre scripts, ballet choreography, sculptures, interactive robotic or light-objects, holography and public installations. The main discourse approaching computer art presented 1968 – 1969 in *Tendencias 4* in Zagreb was information aesthetics of Max Bense and Abraham Moles that was presented in *Bit International* magazine and series of international conferences. Using the same methodology both works from early stage of NT and new computer art could be approached and its aesthetic values can be measured<sup>10</sup>. *Tendencias 4* exhibitions (1968 – 1969) presented in total 189 computer-generated works by 33 artists or interdisciplinary groups alongside other NT works using analog media in visual research. The computer-generated images by Ken Knowlton, Leon Harmon or Manfred Schroeder explored research in visual perception in image resolution, as shifting ASCII technology toward using pictograms instead of ASCII characters (Latin alphabet and Arabic numbers). The interactive computer-generated light objects by Vladimir Bonacic could be manipulated by observer via remote control, or via pressing the knobs at the objects. Its theoretical and working methods and the program were presented in both the accompanying symposium and publication *Bit International*. Bonacic’s installation *DIN PR 18* find its place outside the gallery at the façade of the department store *Nama* and could be interpreted as a play with the conditions of perception as well as a new light system in public space. This dynamic object is titled *DIN. PR 18* and within the title we can see the exact mathematic approach within the artwork. The 36-m-long installation consisted of 18 elements; each element had a 3 x 5 grid light matrix. The installation performed a light show that flickered patterns of the reducible 18<sup>th</sup>-degree polynomial of Galois fields (a pseudo-random algebra). Gustav Metzger also conceived his computer-controlled installation “Five Screens with Computer” for public space that count on interaction of community. In collaboration with different computer scientists Metzger calculated and programmed the rhythm and patterns of destruction of five big panels that suppose to be set up in urban environment. Computer films showed than fascinating animation smoothness as morphing in Czury’s *Hummingbird* and a new possibilities of visualization of mathematic-geometrical dimensions of the hypercube, that is comparable to visualization of pseudo-random algorithm of the Galois fields by Bonacic that was not describable by mathematic algorithm only. Yet looking at the entire exhibition and its subsequent publications, it becomes clear that the key idea was a reflection on a production aesthetic. One of the curators, Radoslav Putar, describes it clearly:

“many followers of the NT have tried to give their work the habit of the machine or else they have based their procedures on the use of mechanical or electrical devices; they have all dreamt of the machines – and now the machines have arrived.”<sup>11</sup>

The computer was perceived as a tool to guarantee “objectivity”, the rationality and traceability of the production process. In creating images, it allows for higher precision and the handling of processes of higher complexity.

Though the link between Concrete art and computer generated art was clearly stated by the curators, only five from more than 120 first wave NT participants took the step from Concrete to computer art. They are: Marc Adrian, Waldemar Cordeiro, Ivan Picelj, Zdenek Sykora and Herman de Vries<sup>12</sup>. The new participants in NT were mainly scientists coming from universities, public and corporate research labs along with a few trained artists. They

---

<sup>10</sup> First two issues of *Bit international* magazine were almost entirely dedicated to it. As well see Cristoph Klütsch, *Computer Graphic-Aesthetic Experiments between Two Cultures: Leonardo*, Vol. 40, No. 5, pp. 432/425, 2007

<sup>11</sup> Radoslav Putar, without title, *Cat. Tendencije 4*, Zagreb: Galerija Suvremene Umjetnosti 1970, n. p.

<sup>12</sup> Alongside others Manfred Mohr and Manuel Barbadillo both made made this step but did not participate in NT network before 1968. Max Beckmann, Charles Czury and Gustav Metzger were among few trained artist who start used computers as well, but not working in the field of Concrete art.

unconsciously radicalized a perspective that was intrinsic to Constructivism, Neo-Constructivism and Concrete art: the central role of the "idea", "structure", and "concept". Artists like Max Bill, Karl Gerstner, Ivan Picelj and others had emphasized the importance of the "idea", the "program" in relation to the physical artwork, but had considered its materiality and presence indispensable. But now, some of the scientists queried the value of the material object in its relation to the "program" which generated it. In March 1969 Frieder Nake wrote a letter to the curator Boris Kelemen: "[Lezlie] Mezei and also Petar Milojevic could not understand, why the competition of t4 is for "objects" and not for "programs", and why nevertheless flow-diagrams are requested. For this reason they deny to participate."<sup>13</sup> Yet, in the end both Mezei and Milojevic took part in the exhibition. In the years of 1968/69 in Zagreb the computer was perceived mostly as a tool for image production alongside few process-based works/outputs. Many works of early computer-generated art did not come out of the 'closed box', i.e., computer programs were important and crucial part of working process. Flow-diagrams and computer programs were requested in the call for works and printed alongside working method explanations in both exhibition catalogues and Bit International magazine (nine issues published alongside Tendencies 4 and 5 exhibitions, 1968 - 1973) and discussed at related conferences.

As rather separate activities at the contemporary art scene we can find another group of practices that was present in the 1960s as Fluxus, Conceptual art, Performance, and Body art and alike. The principle idea of the "program", as a key position for an exhibition, triumphed in 1970. For the Jewish Museum New York, Jack Burnham organized the exhibition "Software. Information Technology: Its New Meaning for Art". The exhibition brought together projects realized with computers and projects by conceptual artists. It offered to the visitors "programmatically structured by artists."<sup>14</sup> Remembering Umberto Eco's programmed "event fields", a loose relation between "arte programmata" and Burnham's "software" could be suggested. But looking more closely, the different approaches are clear. For Burnham "Software" stands, on the one hand, for the mythic structure of art, the aesthetic principles, concepts, or programs that underlie the formal embodiment of the actual art objects. He secondly uses the notion to describe the set of rules, carried out by a machine or by the audience, which follows the "instructions" formulated by the artist. In his concept of a post-object art, the "program" of how to create an object, so important for the NT, loses its importance. His "program" does not create form in the sense of forming matter, but by defining situations. The works in the exhibition were therefore essentially, and in Burnham's formulation, "aniconic".<sup>15</sup> Instead of visualizing mathematical relations, he suggests that "they deal with underlying structures of communication or energy exchange instead of abstract appearances."<sup>16</sup> The computer is conceived as a medium of information management and communication. While Nove Tendencije had sought to "reprogram" society visually by rationally transparent forms, Burnham sought to establish the computer as a tool for artists, which they necessarily need to use in order to be part of the power structure of the emerging information society.<sup>17</sup>

In 1973 the curators of the Gallery of Contemporary Art in Zagreb open up the Tendencies Movement to conceptual art, partially due to a proposal by Jeremy Bentham.<sup>18</sup> In this last exhibition, "tendencije 5", three parts were presented to the public: "constructive visual research", "computer visual research" and "conceptual art". The proceedings of the accompanying symposium, on the topic "The Rational and the Irrational in Visual Research Today", and in the catalogue are evidence of a disinterest and blindness between

---

<sup>13</sup> Letter by Frieder Nake to Boris Kelemen, Toronto, 12.3.1969

<sup>14</sup> Jack Burnham, "Notes on art and information processing"; in: Cat. Software. Information technology: its new meaning for art, New York: The Jewish Museum, p. 10-14, p. 10

<sup>15</sup> Jack Burnham „Notes on art and information processing“, in: Software. Information Technology: Its new meaning for art, New York 1970, S. 11

<sup>16</sup> Jack Burnham „Notes on art and information processing“, in: Software. Information Technology: Its new meaning for art, New York, 1970, S. 11. Further on Software exhibition see Edward A. Shanken, The House That Jack Built: Jack Burnham's Concept of "Software" as a Metaphor for Art published in: Reframing Consciousness: Art and Consciousness in the Post-Biological Era, Exeter: Intellect, 1999., <http://www.artextra.com/House.pdf>

<sup>17</sup> See Jack Burnham, "The Aesthetics of Intelligent Systems", in: On the Future of Art, New York: Viking Press 1970, p. 95-122, p.121

<sup>18</sup> Boris Kelemen, without title, in: Cat. Tendencije 5, Zagreb: Galerija suvremene umjetnosti, 1973, n. p. It is surprising that conceptual art was not discussed earlier within that framework. Three of the responsible organizers of "NT" – Matko Mestrovic and Radoslav Putar and Dimitrije Basicovic Mangeleos – had been part of "Gorgona", an pre-conceptual art group (behaviour as art) working between 1959 and 1966 in Zagreb.

constructive and computer visual research on the one hand and conceptual art on the other. At the "computer visual research" exhibition section the new generation of computer artist presented their works, among others there were groups Groupe art et informatique de Vincennes from France and Computation Center at Madrid University from Spain as well as Centro de arte y comunicaci3n from Argentina.

The new notion on constructing the image and its color is presented in works by Monique Nahas and Hevr3 Hultric from Groupe art et informatique de Vincennes. They developed sophisticated method of constructing material image making original computer programs for perforation of the IBM punch cards, in order that same punchcards are coloured by silkscreen afterwards. Using IBM 1130 and Fortrain programming language they developed two computer programs for their series of works Plan and Continual Series where special attention were put on study of the color brightness. The computer program Poch is the program for perforating punch cards and Copet is developed for distribution of location of holes at the punch cards<sup>19</sup>.

Such developments of constructing the image were out of focus for most of the conceptual art of that time, as it interest rely on non-objective art. Nevertheless, NT organizers try to bind those practices throughout the notion of the program. Radoslav Putar, director of the Gallery, used the term "data processing" to describe methods of conceptual art, though this possible link was not investigated further.<sup>20</sup> Frieder Nake established a similarity between computer and conceptual art on the level of "separation of head and hand"<sup>21</sup>, criticizing it for being a production structure following the logic of capitalism. But neither in the catalogue or in the symposium, the structuralist thought which allowed Burnham to link computer controlled and conceptual art and which was also present within NT via Abraham Moles, was not developed.<sup>22</sup>

Radoslav Putar and Boris Kelemen were underlining the importance of constructive and computer visual research, while the introductions to the concept art sections by Nena Dimitrijevic and Marijan Susovski revealed the situation in Zagreb by 1973: it is the time of the "post-object", the "non-formal", the "non-visual"<sup>23</sup>. NT was perceived as a far precursor that had separated the idea from its execution, but had been "still involved in the material and visual sphere". Conceptual art, in this sense, was beyond "the scope of the New Tendencies".<sup>24</sup> Nevertheless, the notion of the program one can find in exhibited works of Conceptual art at the T5. Sol Le Witt exhibited Wall painting that was executed after textual instruction that fit into one sentence. Such an instruction we can clearly see as the program. Goran Trbuljak exhibited two drawings of his eye-tracking made in hospital by the medical personal. First drawing shows average medical examination routine but in other artist intended to manipulate the medical test with his eye-movements. Despite the fact of immateriality of computer or analog program, such works of Conceptual art fills the gap between object/picture-orientated NT "visual research" done with or without computer and "non-object art" of Conceptual art. As in majority of works of Conceptual art the idea is separated form its execution. In other hand, works are made as execution of instructions of both narrative and formal nature, that we can see as its program.

Computer-generated art's attraction faded gradually from the art world in general during the 1970s. Computer graphics of the 1970s explored the possibilities of computer-generated figurative visuals and entered - with the provision of animation and special effects for the mainstream film industry - the commercial world as well as the military sector, advancing virtual-reality techniques that mimic "real life." This development, within the context of the dominance of emerging practices of conceptual and non-object art that utilized post-

---

<sup>19</sup> Program published in "The Rational and Irrational in "The Rational and Irrational in Visual Research Today / Match of ideas", symposium t-5, 2 June 1973, symposium reader, Zagreb: Gallery of Contemporary Art, 1973, n.p.and Irrational in Visual Research Today"

<sup>20</sup> Radoslav Putar, without title, in: Cat. Tendencije 5, Zagreb: Galerija suvremene umjetnosti, 1973, n. p.

<sup>21</sup> Frieder Nake, "The Separation of Hand and Head in "Computer Art" (1973), 9 pages, in "The Rational and Irrational in Visual Research Today / Match of ideas", symposium t-5, 2 June 1973, symposium reader, Zagreb: Gallery of Contemporary Art, 1973, n.p.and Irrational in Visual Research Today"

<sup>22</sup> Abraham A Moles, "Ars Ex Machina", manuscript, 3 pages, p. 1, "The Rational and Irrational in Visual Research Today / Match of ideas", symposium t-5, 2 June 1973, symposium reader, Zagreb: Gallery of Contemporary Art, 1973, n.p.

<sup>23</sup> Nena Dimitrijevic, without title, in: Cat. Tendencije 5, Zagreb: Galerija suvremene umjetnosti, 1973, n. p.

<sup>24</sup> Marijan Susovski, without title, in: Cat. Tendencije 5, Zagreb: Galerija suvremene umjetnosti, 1973, n. p.

Duchampian ideas of art and representation, led to computer-generated art's almost-total exclusion from the contemporary art scene around the mid-1970s. This development was propelled by rising anti-computer sentiment among the majority of the new generation of artists, in view of the negative impact of the use of science and technology by the military-academic-corporate complex in the Vietnam War and elsewhere. In the mid-1970s, major protagonists of computer art, such as Metzger and Jack Burnham, turned their backs on it. In Zagreb the NT movement also drew back: Tendencies 6 started with the conference Art and Society in 1978, but the planned exhibition never took place. As the focus had shifted to video, conceptual and non-object art, a different exhibition was shown. Media-orientated artists start to use mostly analogue mediums as typewritten text, video, photography and Xerox exploring the notions of the program as of Conceptual art. It took about twenty years that computer-based art come back to contemporary art scene in 1990's, but this time merged with the experience of continual conceptual art practices.

The question of materiality of the works seems to be irrelevant in contemporary art discourse today. Instead of focus on the building blocks of the artwork its position and program (realized or not) toward information society (including among other critical approaches ones toward computer networks, platforms, software and programming languages as well of their production and distribution models) seems to be more relevant within the context of contemporary art and wider cultural position. As we learned from the art of 1960s, the notion of the program in art changing as art changes, i.e. constantly.