PAGE 17

JULY 1971

BULLETIN

OF THE

COMPUTER ARTS

SOCIETY

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AIMS AND MEMBERSHIP

The Society aims to encourage the creative use of computers in the arts and allow the exchange of information in this area. Membership is open to all at 1 or 3 or fl 10 per year, students half price. Members receive PAGE eight times a year, and reduced prices for the Society's public meetings and events. The Society has the status of a specialist group of the British Computer Society, but membership of the two societies is independent.

Libraries and institutions can subscribe to PAGE for 1 or 3 or fl 10 per year. No other membership rights are conferred and there is no form of membership for organisations or groups. Membership and subscriptions run from January to December. On these matters and for other information write to Alan Sutcliffe.

COMPUTER ARTS SOCIETY ADDRESSES

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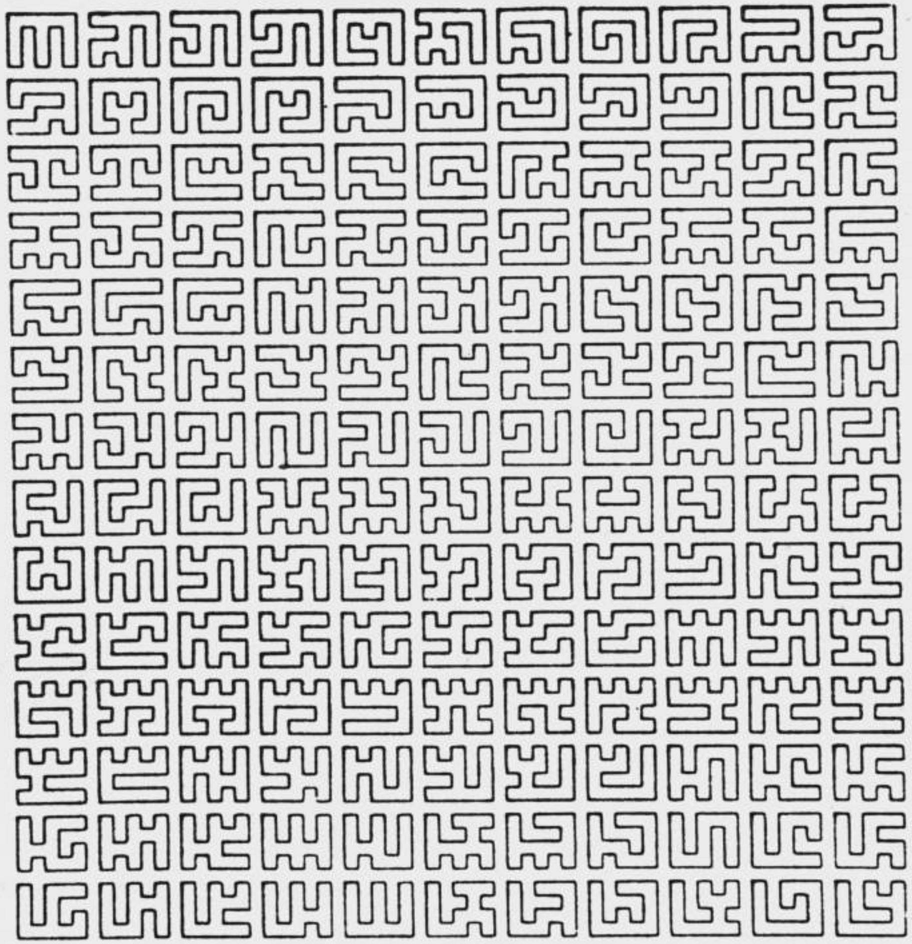
This issue of PAGE was edited by Leo Geurts and Lambert Meertens, and printed at the Mathematisch Centrum, Amsterdam.

DESIGNING LETTER-LIKE SHAPES

The appearance of a text, written in an unfamiliar alphabet, will almost always be aesthetically pleasing to me. This fact has intrigued me for some time, so I have tried to find an explanation for it. What I believe to be the essential thing, is that the characters have shapes which are so different and yet, at the same time, so strikingly similar. This theory can be tested, of course, by designing sets of forms that are different but similar. The difficulty is, however, to operationalize the notion of "similarity" of forms. Moreover, not each set of similar forms looks "alphabet-like", but, apart from the requirement that the forms can be regarded in principle as consisting of strokes, I have no idea what plays a role here. I hope once to be able to program a computer to design character sets where each new set will come as a surprise - even to the programmer. This is, however, a distant ideal. What is possible now, is to take some (partly unspecified) construction principle and to generate forms according to it.
Some time ago, when I was doodling, I drew a number of letter-like shapes. I observed that these forms had something in common that made them pleasant to look at. So I tried to formulate their common property: may be thought of as consisting of squares; nowhere do four squares clot together; the same holds for the "negative" shape; all parts are connected; there are no holes in it. Although this suffices to define the forms, it is not simple to derive a generating program from this definition. So this problem remained dormant. Then, about a year later, working on an entirely different problem, I hit upon a much more manageable definition:
Consider a rectangle of grid points of a square grid, containing an even number (e.g. 5 × 6) of grid points. Now we have to make a tour of these points, calling once at each point and returning to the starting-point, but in such a way that the total distance covered is minimized.

This problem will have a number of solutions, which correspond exactly to the shapes defined above (and vice versa). Now this does not represent a trivial problem - far from that - but it provides a good basis for a program set-up which is open to many ways of improving the efficiency. An ALGOL 60 program to list all solutions for a given m × n rectangle was written by Michiel Baron, a 17-year old schoolboy. It is one of the most sophisticated



programs I have ever seen. The technique is that of "backtracking", but as the route is built up step by step, each time far-reaching conclusions are drawn by application of rather intricate arguments, showing that certain paths are barred, i.e., cannot be part of a legitimate completion of the partial route. This gives a tremendous reduction of the branching rate and cuts the necessary computing effort to acceptable proportions.
The complete list of solutions for the 5 × 6 case, which is reproduced here, was computed and drawn in 7 minutes time, using the Electrologica X 8 of the Mathematical Centre.

Lambert Meertens

PETER STRUYCKEN

Peter Struycken designed a new system to generate visually interesting patterns, built up from his sixteen black/white modules. In comparison with his 1970 structures (see PAGE 9) his new ones are more redundant. Take for example the structure in fig. 1. Looking at it from some distance, you see it consists of four square blocks, each with a diagonal build-up. The scheme

0	1	2	3	4	5	6	7	8	9
9	0	1	2	3	4	5	6	7	8
8	9	0	1	2	3	4	5	6	7
7	8	9	0	1	2	3	4	5	6
6	7	8	9	0	1	2	3	4	5
5	6	7	8	9	0	1	2	3	4
4	5	6	7	8	9	0	1	2	3
3	4	5	6	7	8	9	0	1	2
2	3	4	5	6	7	8	9	0	1
1	2	3	4	5	6	7	8	9	0

fig. 2

of each of the four squares is given in fig. 2. Each of the numbers in the diagram refers to one of a set of 10 modules:

but the assignment of the modules to the numbers in the diagram is done four times at random, so each of the four squares differs from the other three, although the diagonal build-up is the same.
The structure in fig. 3 is also produced along these lines, only it is composed from 7 × 7 square blocks, each containing 4×4 modules in a diagonal order. The elements used are:

Fig.4 is composed of 7 × 7 square blocks, but the order inside each block is not diagonal, but random. However, all 49 blocks have the same random pattern:

2	0	1	3
0	0	1	2
0	0	2	0

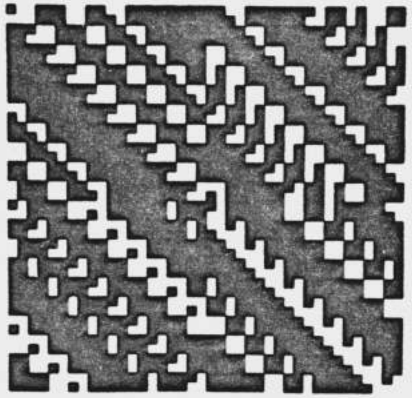


fig. 1

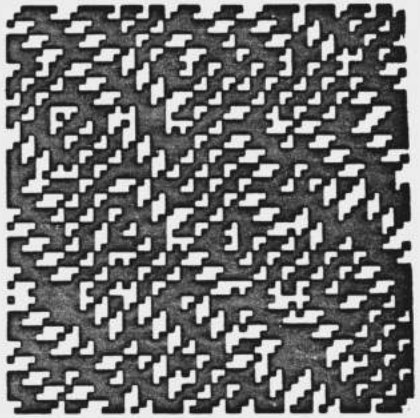


fig. 3

only the assignment of modules to the numbers 1, 2, 3 and 4 has been done 49 times at random. The modules to be assigned each time were:

The structure in fig. 5 is built up from 10 × 10 square blocks of 2 × 2 modules.

Pattern used:

0	0
1	1

Modules used: 

For more information: Galerie Swart
Van Breestraat 23
Amsterdam, Holland.

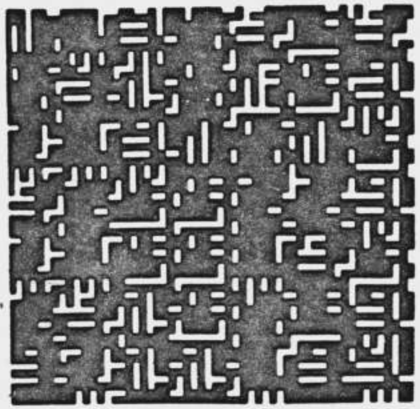


fig. 4

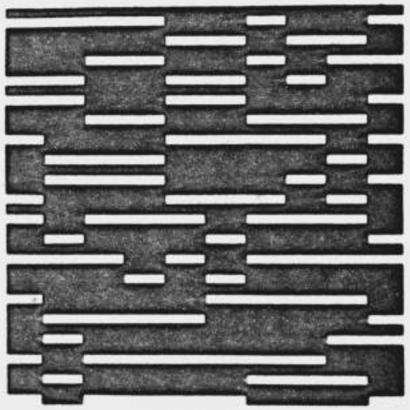


fig. 5

EKT

The foundation EKT (Experimenten in Kunst en Technologie) tries to stimulate the relation between art, science and technology. For this purpose, EKT wants to s'art scientific-artistic projects and promote information exchange and education in this field; it wants to place the facilities it acquires at the disposal of artists.

EKT aims especially at computer facilities; it is trying to get computer time and programming assistence from universities, firms and government institutions, and is promoting programming courses for artists. Money is still a problem, especially since the new Dutch government is cutting down most budgets. Of course, CASH cooperates closely with EKT.

Address: The Secretary of EKT
Drs. G. van der Mey
Raamweg 43
Den Haag, Holland.

POETRY

In the Review of the ITL, 11(1971), (published by the Institute of Applied Linguistics, Louvain, Belgium) appeared an interesting article of Louis T. Milic on his RETURNER-program, which is a poetry program written in SNOBOL 4 (the full program text is given). The program uses a given piece of poetry and generates short stanzas based on the vocabulary and structure of the source poem. It contains features like question-transformation and time-transformation, it takes account of transitivity of verbs, etc. As the author states, the program lacks a proper handling of the variation in vocabulary and structure from one stanza to the next. A bibliography is given with 18 references, ranging from 1962 to 1971.

These stanzas were produced on the basis of Alberta Turner's poem RETURN:

001. In the morning crowbars will be nearly round,
Separate blankets never step again.
Tomorrow I will ring him through the willows.

002. Do mice sometimes become like deer at home?
Hemlocks hiss from salad to salad now
But yesterday he often pawed all the apples at the milk pan.

003. In the morning the quicksand will seem silver.
A thin curd also staggers again.

INSTITUTE OF SONOLOGY

During the academic year 1971-1972 the Institute of Sonology of the Utrecht State University will offer courses in both theoretical studies (sonology) and sound production. These courses are organised as workshops, introduced with some lectures. Suggested topics are: computer programming, theory of probability, equipment and circuitry, sound generation, analysis and synthesis of speech, electronic music, problems of notation.

Lectures and workshops take place from October to May, on Tuesdays and Wednesdays, the remainder of the week being available for practical projects and private study. Available facilities are : a library of books, records and tapes, several studios (both manual and voltage-controlled sound production), a PDP-8 computer, and several composition programs for instrumental music. The instruction language will be English. The study fee for all lectures and workshops is fl 100 per year.

For further information:

The Secretary
Institute of Sonology
Plompetorengracht 14-16
Utrecht, Netherlands.
(Tel. (030)19646)

IS BEAUTY RANDOM?

During some experiments with computer-art programs (starting with random points and then methodically elaborating patterns) it occurred to me that my most simple program - producing only a random curve - delivered the best results. Best in the sense of pleasing to the eye, characteristic, or if you want: beautiful. So in this restricted sample - eight programs in all - the answer to my question clearly was: Yes, beauty is random.

Now as we all know there are quite a few rather random events that produce beautiful results. Think of mountains, clouds, rivers, sunsets and of such patterns as are formed by falling ropes and rising smoke, to name only a few. At the other hand theoreticians have assured us that the beauty of plants, buildings, paintings rests mainly upon a lot of rules: golden section, balance of forces, et cetera.

In contrast with this it is clear that rules certainly can produce awful results - think of certain buildings for instance - and also that randomness can create chaos, not pleasant to behold, to say the least: something like the contents of a dustbin.

In short: randomness can be part of beautiful things as can be strict rules, but both can produce rubbish also. It is my opinion now that chance or randomness not only can be part of, but plays an essential role in art, and I think that this has been too much overlooked. (Too often for instance we see people being surprised that much randomness in their art-programs creates pleasant results.) To state my point more clearly: the balance of chance and rules is what produces beautiful things.

fig. 1

fig. 2

The question now arises: what can we say more about this disorder-order problem, and how can a computer assist us here. In the first place I can say - as an amateur artist and professional programmer - that this problem would not have occurred to me but for nights and nights of studying the results of my computer-art programs. In this way the computer acted as a kind of teacher, and a very severe one at that.

After this lesson I switched to doing some experiments with my bare hands, except for a pencil. Being an amateur artist, I am in the possession of some quite mediocre drawings, and my reasoning was that perhaps more randomness could improve my style: too strict a discipline in art lessons (as has been my plight at school) can be a hindrance to, or can even murder, the original spontaneity one has as a child (like growing up, and orderly conduct). Perhaps we can even say that someone like Picasso has a masterly grip on chance that lacks most of us. So I took some bad drawings, closed my eyes and made some random pencil dots on their surface. I now made a copy of these drawings, forcing some lines to go through the added points. See illustrations 1 and 2. It is clear that at least the greater randomness does not produce a worse result. And yet, notwithstanding my reasoning, this came rather as a surprise to me.

My second experiment was in the field of blind art, as you may call it: close your eyes and draw all kinds of lines just as you please. Then - open-eyed - colour the so formed areas alternatingly black and white. In this way I got some interesting results. Interesting because they can easily pass as 'normal' abstract drawings.

My third experiment - and here we go back to the computer again - was with a program based upon experience gained by the foregoing process. One of my blindfolded drawings consisted of (near) circles and straight lines and the program imitates this (see description at the end of this article). It simply draws eight circles and five straight lines in a rectangle. Colouring the results by hand - in the way described above - you get more or less 'artistic' drawings. Note that these drawings are a combination of randomness and very simple rules (as are most computer-art products). One result is shown here (figures 3, 4, 5, 6). These four drawings are from the same design. They differ only in being coloured with different degrees of randomness. It is perhaps interesting to see for yourself which is which and which you like most, or perhaps dislike least.

As an advantage of this program I see the fact that it is based upon live experiments: this is a different kind of man - machine interaction. You start with making some simple design by hand and afterwards try to translate its principle into machine language. A further advantage is that this computer program is also a 'manprogram'. With a piece of paper, a pencil and a die you can make your own programmed designs, and so - I am convinced - get more emotionally involved. And besides: you need not be a professional programmer to make such programs. Perhaps this could be a way to bridge the gap between some artists and computer people.

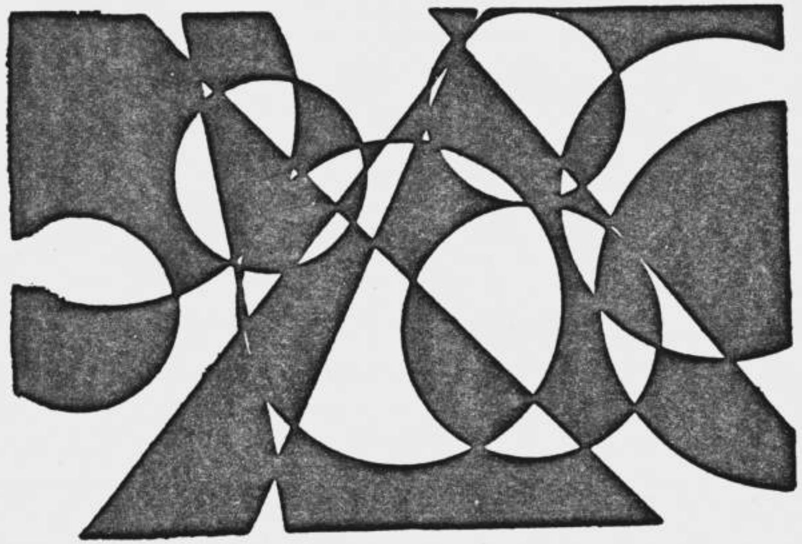
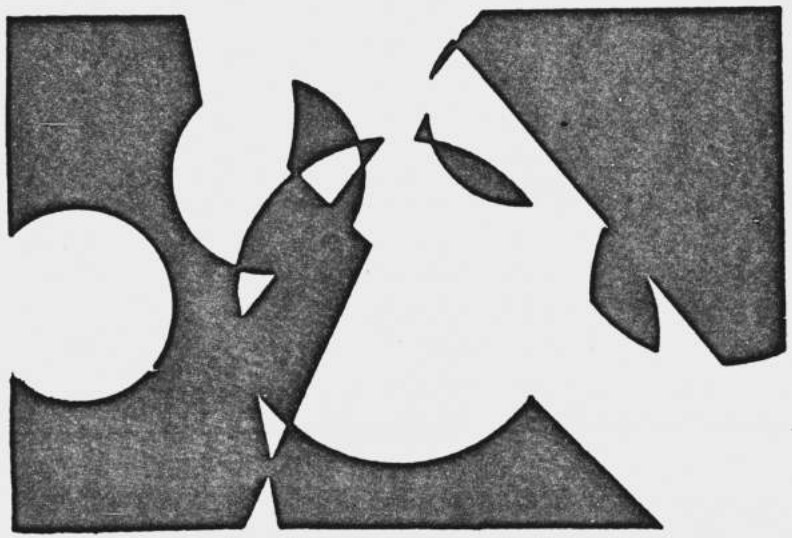


fig. 3



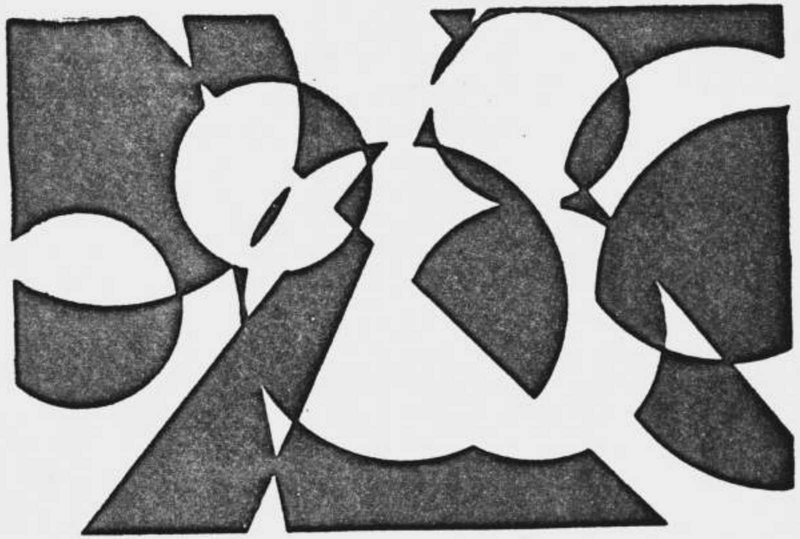


fig. 4

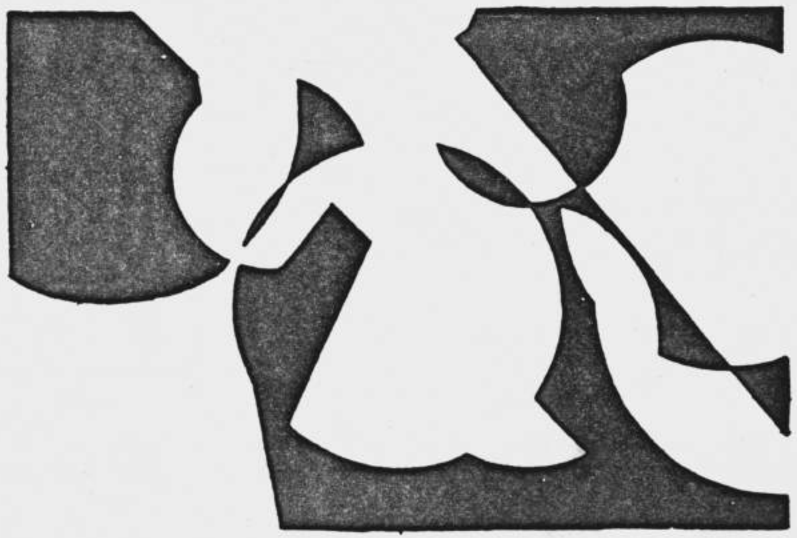
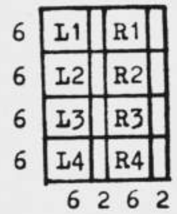


fig. 6

of some ideas. Much has to be done yet before we shall be able to write more convincing stories. And of course only the computer can assist us to make enough of these drawings - mixing all degrees of rules and randomness - to see if we can get more insight into this kind of problems. In a more practical field I got another encouraging result already by asking 'inartistic' children to draw a simple landscape or abstract drawing through a set of random points. They were very enthousiastic about this new way of creative expression and made better drawings than they ever did before. Nevertheless, as I am not a teacher, I am rather hesitant to go further along this line: perhaps they'll get into another rut this way. I would very much like to hear, though, from anyone who is interested in this or similar experiments. And - to end with - a poetical note for those who are of a more reflective kind: reflections in water provide excellent examples of the eternal play between rules and chance.



Man program:
Draw a rectangle of 16 by 24 units (centimeters for instance).
Make divisions as indicated in illustration.
For each 6 by 6 square determine the coordinates for the centre of a circle by throwing a die two times. Another throw yields the radius of the circle. Draw the circle as far as the rectangle allows. In this way you get 8 circles in all. For the 5 lines: Number the squares at the left: L1, L2, L3, L4 and at the right: R1, R2, R3, R4. Throw a die (ignoring eyes 5 and 6) two times to see which L will be connected with which R. In these two squares determine the points through which the line will go, in the way you did for the centre of the circles. Draw the line. Do this 5 times. Colour as you like. Make other man programs and contact writer if you like.

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