



Algorithmic Forms in Art / Generative Art

VA345 Creative Coding

Course Instructor : Assoc. Prof. Dr. Selcuk ARTUT



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LIA: Coding Life

01 October 2021 – 27 November 2021



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Exhibitions & Events / Events / The Art of Generative Thinking

The Art of Generative Thinking

Manfred Mohr in
Conversation

Tue, 12.10.2021, 6 pm
CEST





Food for thought

Joachim Sauter - media artist and designer

Joachim Sauter



After graduating from the academy of fine arts in Berlin, Joachim Sauter studied at the 'German Academy for Film and Television', Berlin.

Since mid of the 1980s, he has been working as a media artist and designer. From the beginning, Joachim Sauter has focused on digital technologies and is experimenting how they can be used to express content, form, and narration.

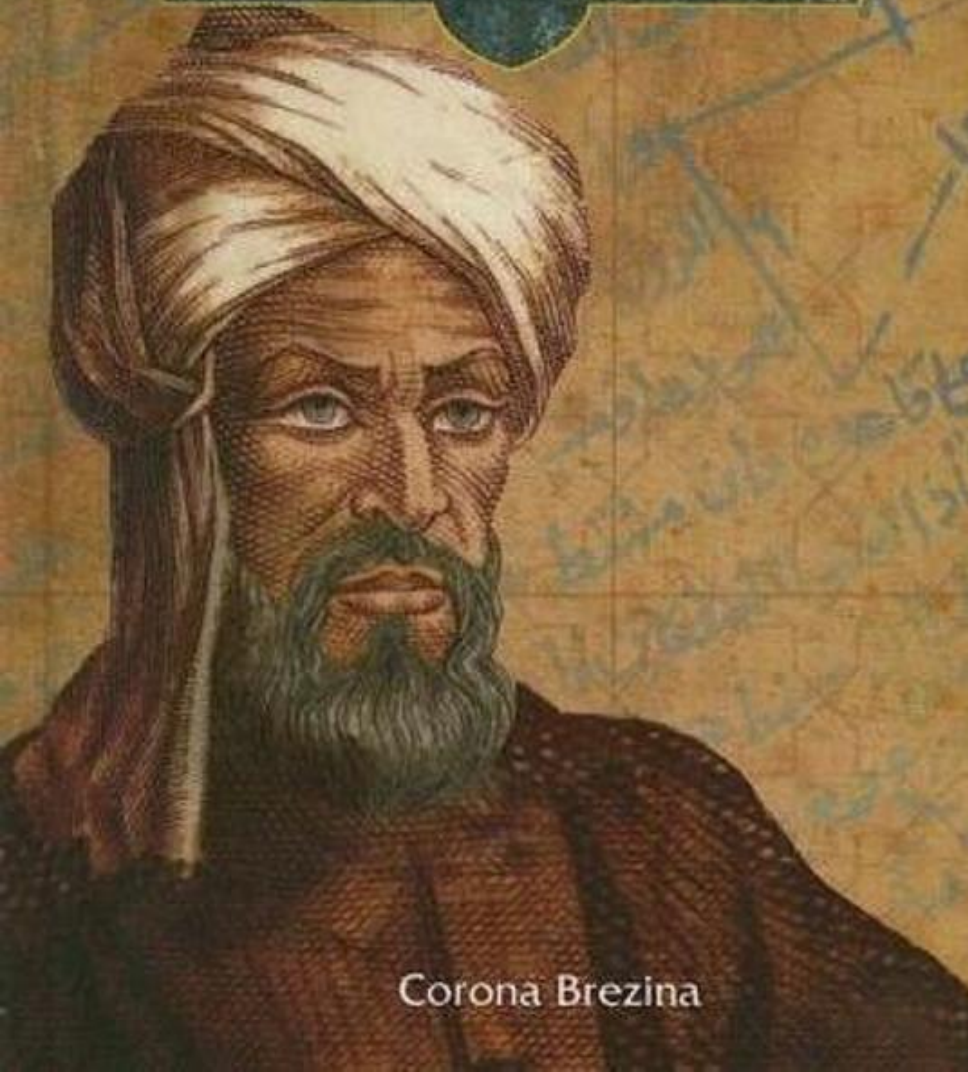
Fueled by this interest, he founded ART+COM in 1988 together with other artists, designers, scientists, hackers and technicians.

Their goal was to practically research this new up-and-coming medium in the realm of art and design. Until now, he is leading this interdisciplinary group.

Algorithm

AL-KHWARIZMI

The Inventor of Algebra



Corona Brezina

The word «algorithm» comes from the name of Persian mathematician al-Kharizmi, author of a ninth-century book of techniques for doing mathematics by hand. His book was called al-Jabr wa'l-Muqabala – and the «al-jabr» of the title in turn provides the source of our word algebra.

The earliest known mathematical algorithms, however, predate even al-Khwarizmi's work: a four-thousand-year-old Sumerian clay tablet found near Baghdad describes a scheme for long division.

Bubble Sort

Bubble sort is a simple sorting algorithm. The algorithm starts at the beginning of the data set. It compares the first two elements, and if the first is greater than the second, it swaps them. It continues doing this for each pair of adjacent elements to the end of the data set. It then starts again with the first two elements, repeating until no swaps have occurred on the last pass.

<https://visualgo.net/bn/sorting>

Let's

Algorithm Together

Try : Bubble Sort

Stable Marriage Problem

Given n men and n women, where each person has ranked all members of the opposite sex in order of preference, marry the men and women together such that there are no two people of opposite sex who would both rather have each other than their current partners. When there are no such pairs of people, the set of marriages is deemed stable.



<https://www.youtube.com/watch?v=Qcv1lqHWAzg>

Secretary Problem

Look-Then-Leap Rule: You set a predetermined amount of time for «looking» - that is, exploring your options, gathering data – in which you categorically don't choose anyone, no matter how impressive.

After that point, you enter the «leap» phase, prepared to instantly commit to anyone who outshines the best applicant you saw in the look phase.



<https://www.youtube.com/watch?v=ZWib5oIGbQ0>

Extended : <https://www.youtube.com/watch?v=XIOoCKO-ybQ>

THE SECRETARY PROBLEM SOLUTION DETAILS

3

$$P'(r) = -\ln x - 1 = 0 \implies x = \frac{1}{e}$$

$$P\left(\frac{1}{e}\right) = \frac{1}{e}$$

$$\frac{1}{e} \approx .37$$

The ratio of r to N is optimal at $\frac{1}{e}$ yielding a probability of success of, coincidentally, $\frac{1}{e}$ as well. So for $N \gg 1$ the $r_{optimal}$ is nearly $\frac{N}{e}$, otherwise it can be found by computing $P(r)$ directly.

The Secret Rules of Modern Living : Algorithms

BBC Documentary

Generative Art

Generative art refers to art that in whole or in part has been created with the use of an autonomous system. An autonomous system in this context is generally one that is non-human and can independently determine features of an artwork that would otherwise require decisions made directly by the artist. In some cases the human creator may claim that the generative system represents their own artistic idea, and in others that the system takes on the role of the creator.

wikipedia

Creative Coding Essentials

Computer Programming (Coding – sounds cool)

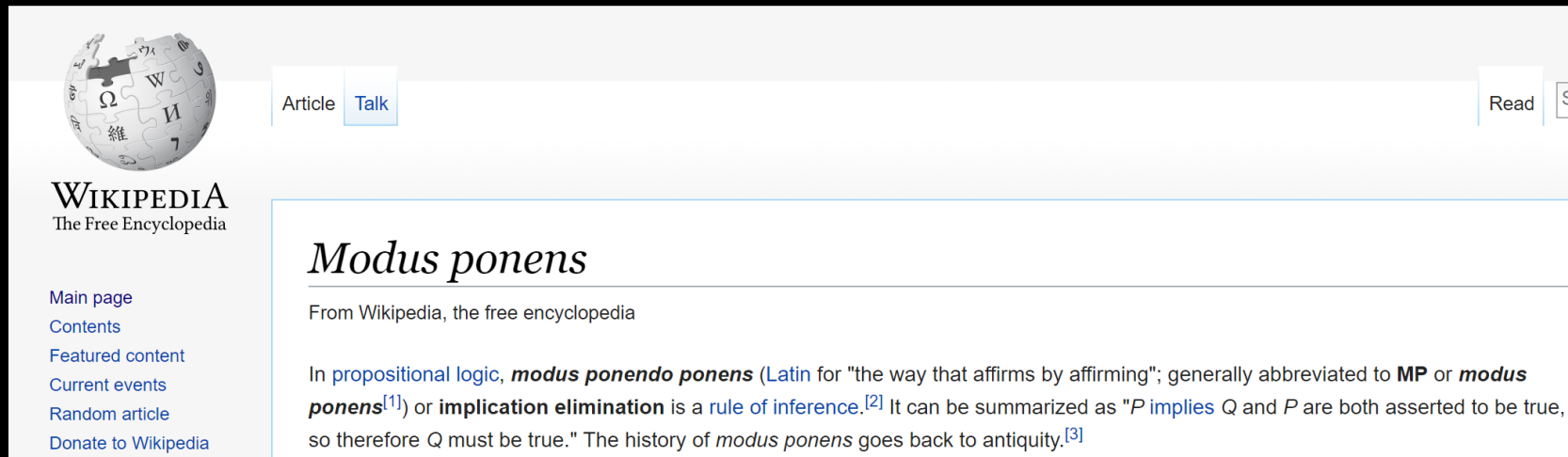
Software

Rule based systems

Earliest examples Modus ponens

If you believe that A is the case, and believe that A implies B, then you ought to believe that B is the case

Rituals, laws, political systems etc



The screenshot shows the Wikipedia article for "Modus ponens". The page layout includes a sidebar on the left with the Wikipedia logo and navigation links, a top navigation bar with "Article" and "Talk" tabs, and a main content area. The article title "Modus ponens" is displayed in a large, italicized font. Below the title, a summary line reads "From Wikipedia, the free encyclopedia". The main text begins with "In propositional logic, **modus ponendo ponens** (Latin for 'the way that affirms by affirming'; generally abbreviated to **MP** or **modus ponens**^[1]) or **implication elimination** is a **rule of inference**.^[2] It can be summarized as "*P* implies *Q* and *P* are both asserted to be true, so therefore *Q* must be true." The history of *modus ponens* goes back to antiquity.^[3]

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Modus ponens

From Wikipedia, the free encyclopedia

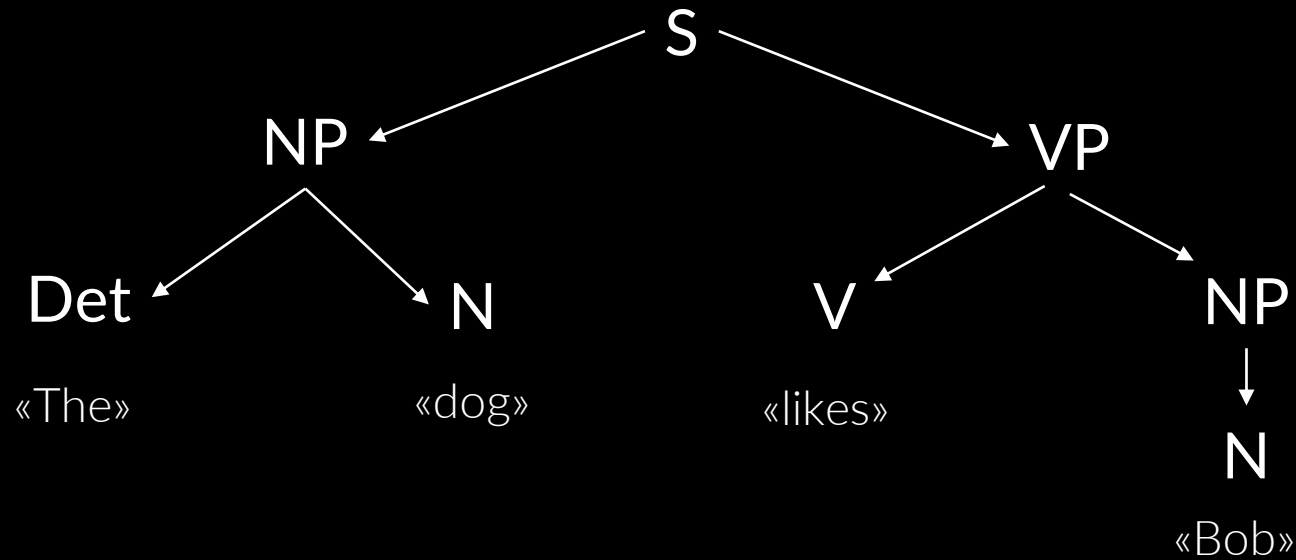
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Rule based systems

- Formal Languages vs Natural Languages
- It is easier to define a formal language than a natural language, because formal language is synthetic, expressive, compact etc.
- Language = grammar + dictionary
- Computer languages : Backus-Naur form (1959) - Algol60

Generative Grammar for Syntax

- We can formalize a syntax of a language using a grammar



S : Sentence

NP : Noun phrase

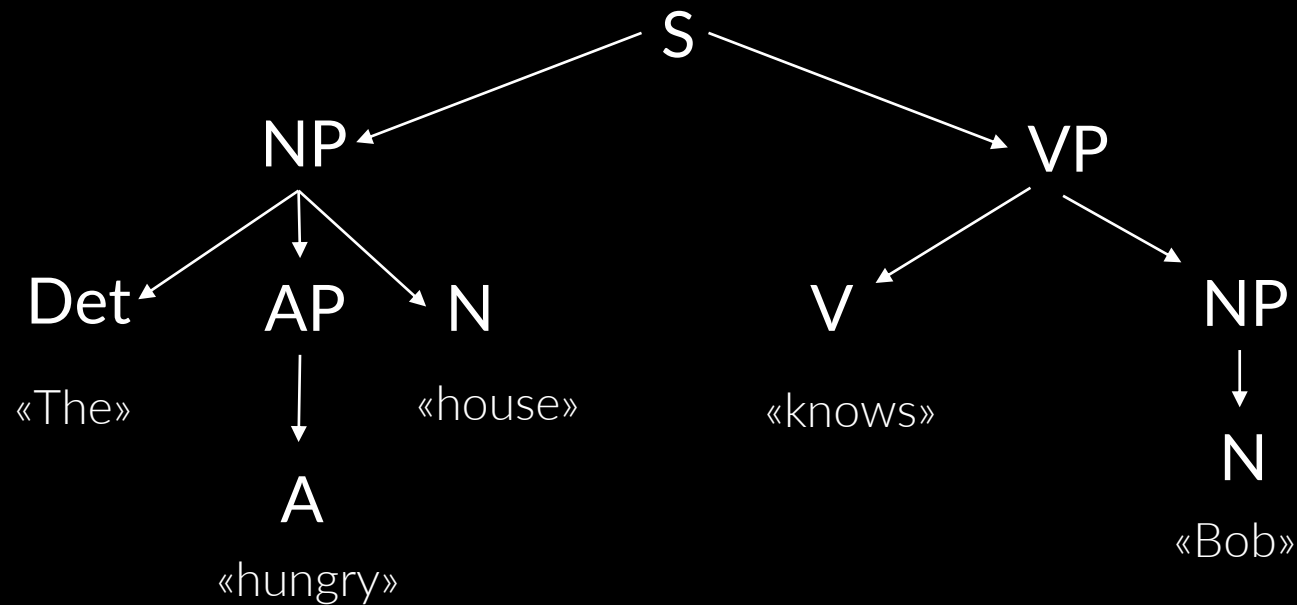
Det : Determinant

N : Noun

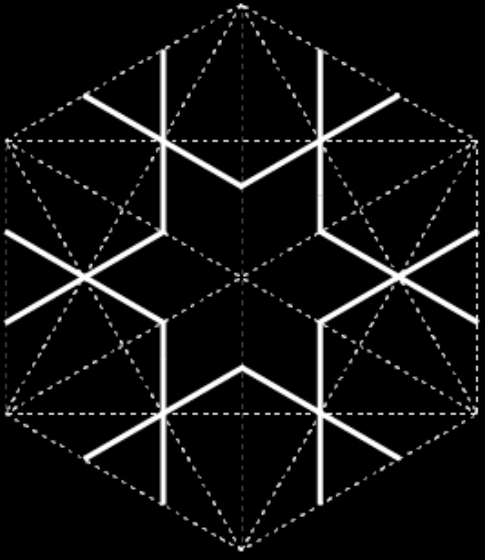
V : Verb

VP : Verbal Phrase

A sentence can be syntactically correct but semantically wrong



S : Sentence
NP : Noun phrase
Det : Determinant
N : Noun
V : Verb
VP : Verbal Phrase
AP : Adjective Phrase



Hands on tutorial

Drawing an Islamic Geometric Pattern / Eşrefoğlu Mosque, Beyşehir

