



self-similarity

algorithmic design
beyond iteration




image representation methods: pros and cons?

- pixel-based representation?
- algorithmic representation?



can natural scenes be described algorithmically?



“[in addition to symmetry] two other factors that organize plant structures and therefore contribute to their beauty [are] *developmental algorithms*, that is, the rules which describe plant development over time [and] *self-similarity*”

*P. Prusinkiewicz and A. Lindermayer,
“The Algorithmic Beauty of Plants”, 1990*

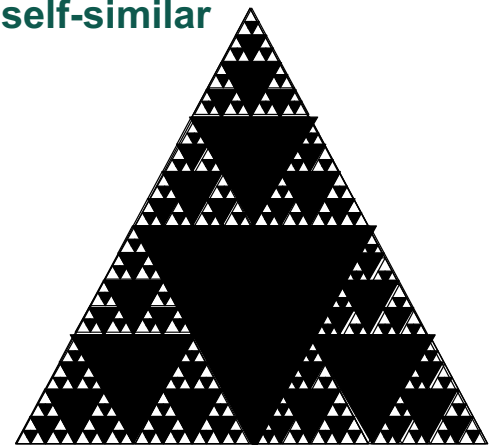


self-similarity

“when each piece of a shape is geometrically similar to the whole, both the shape and the cascade that generate it are called self-similar”

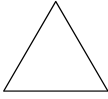


the sierpinski triangle: a simple self-similar object

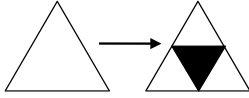


describing the sierpinski triangle

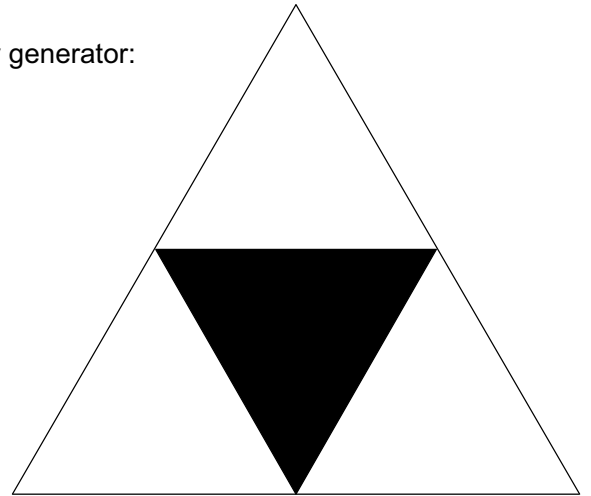
initiator:



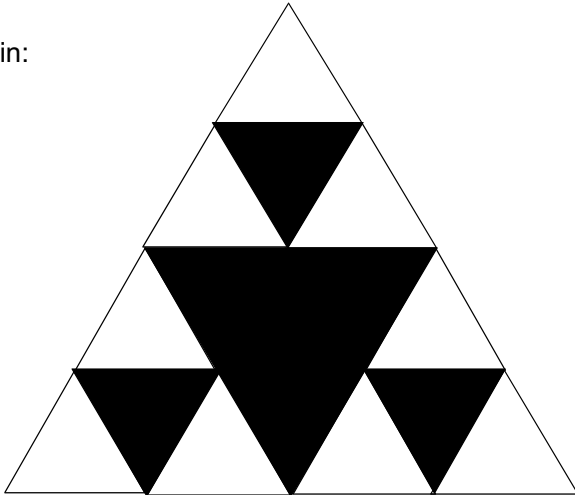
generator:



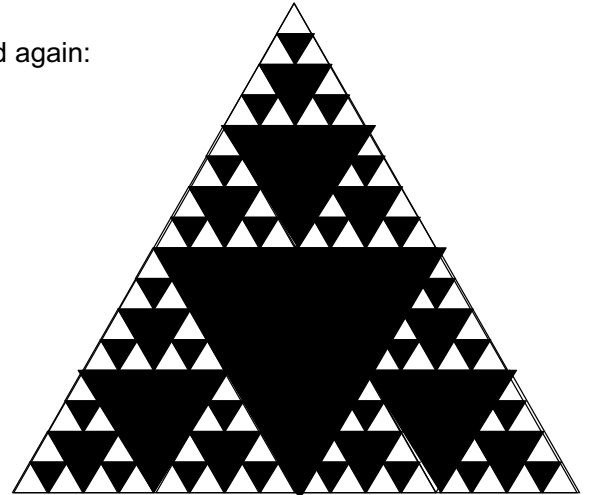
apply generator:



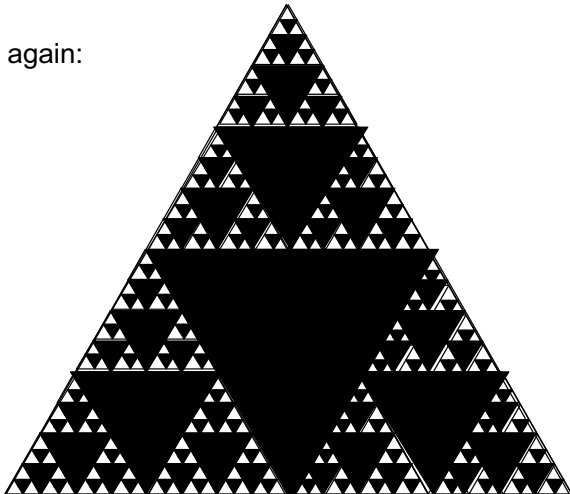
... again:



... and again:



... and again:



the Sierpinski triangle has a compact description

it is completely described by:

- the initiator
- the generator
- the number of times the generator is applied*

* Technically, this is not entirely accurate, since the true Sierpinski triangle is the structure obtained in the limit, as the generator is applied infinitely often.

exercise

initiator:



generator:

