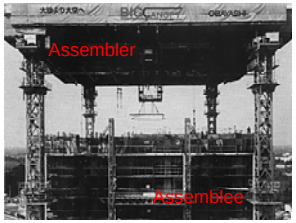
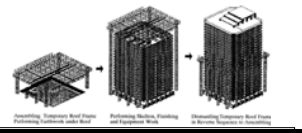
Name: Taro Narahara
Class: How to make something that makes (almost) anything
Assignment_01: Design a self-reproducing machine

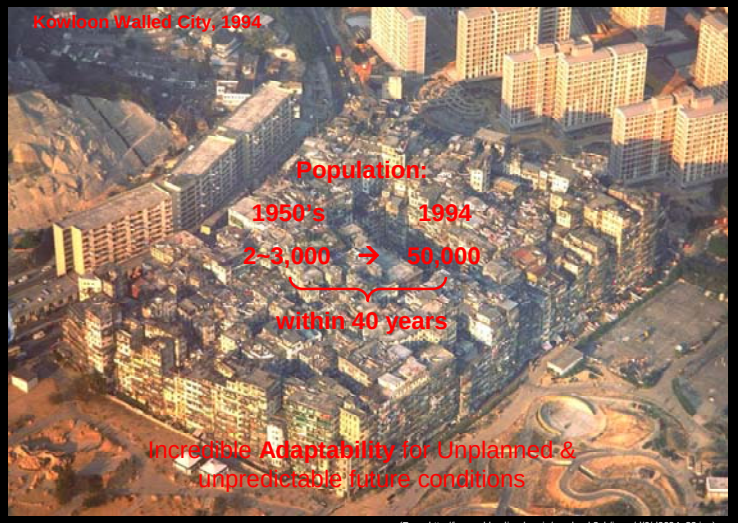
Construction Automation in 80's



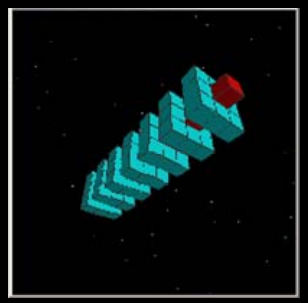


Metabolists Movements in 60s

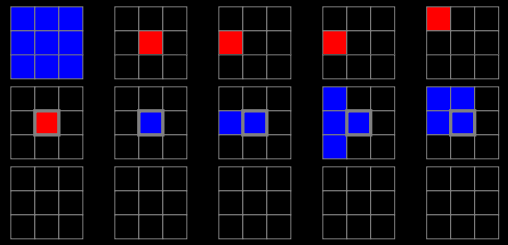
I am interested in integration of *assembler* and *assemblee* relationships in architecture.
Components provide Habitable space and become fabricator for themselves.



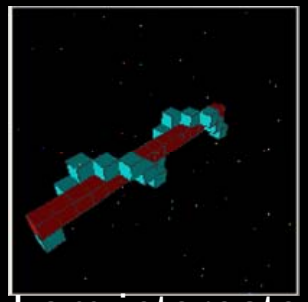
Building components can move and replace themselves in response to constant environmental and programmatic changes. → Adaptability



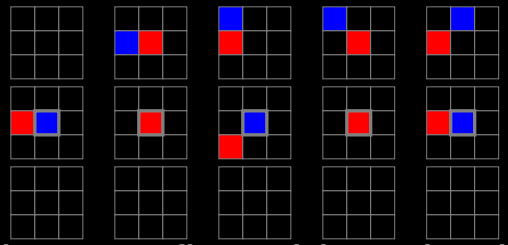
Rules produce Deterministic Structure

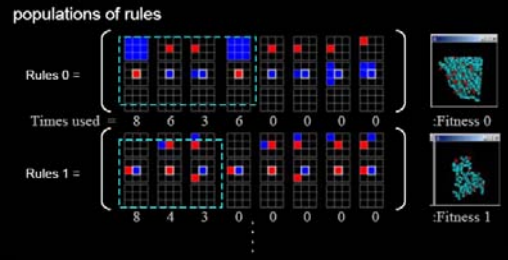


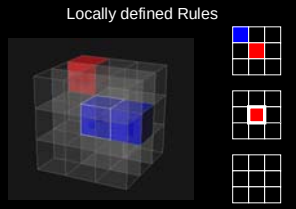
Allow 90degree Rotations

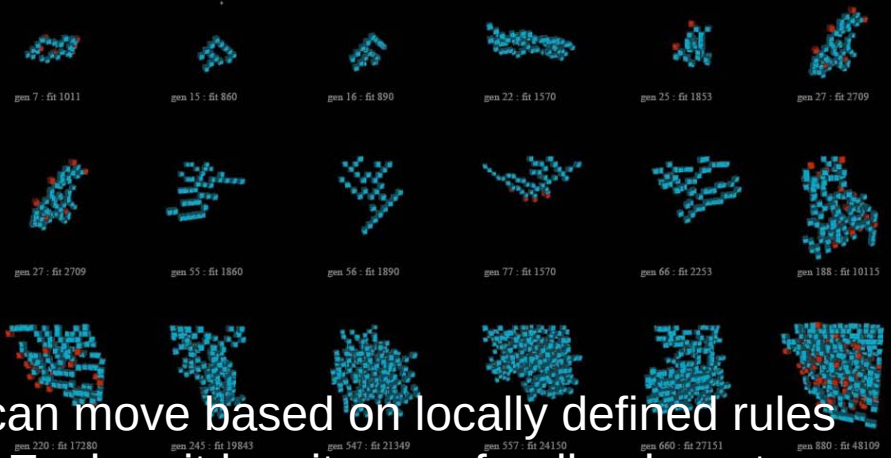


Rules produce Semi-Deterministic Structure

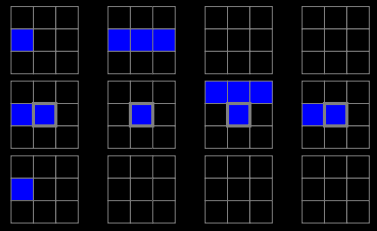








I am interested in reconfigurable units that can move based on locally defined rules rather than imposing top-down instructions. Each unit has its own feedback system.



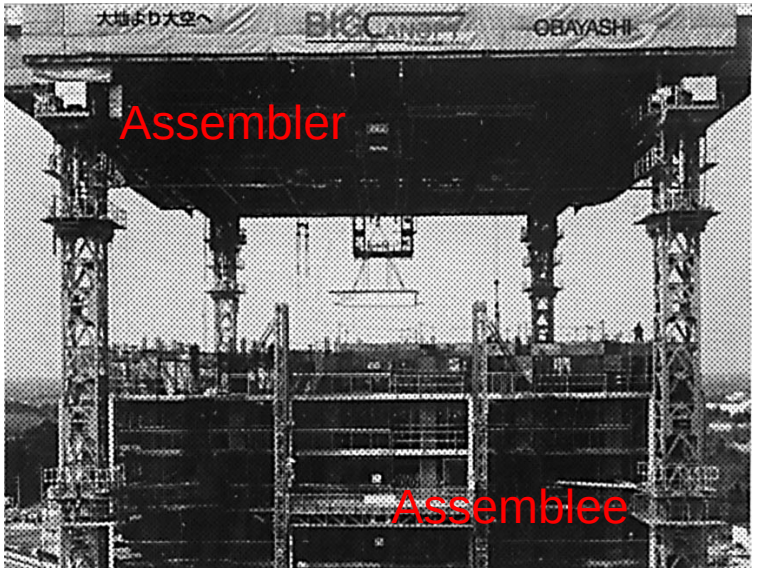
Rules produce Non-Deterministic Structures

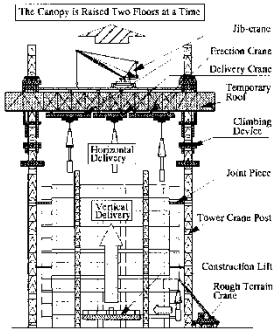
The lamp shade made out of many Velcro strips.

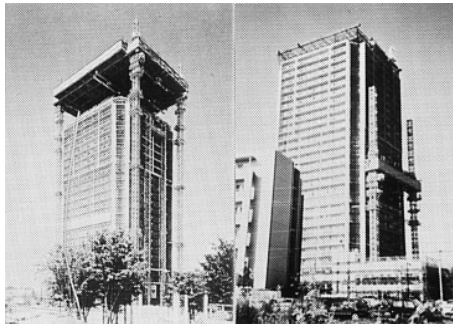
I am also interested in having *greater tolerances* for assemblies of units. Pictures here show some inspirations I found.

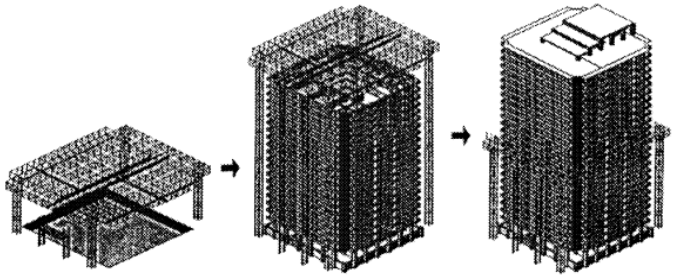
Spiky units that can snap and fit each other.

Construction Automation in 80's



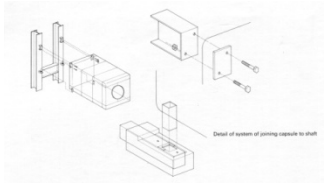


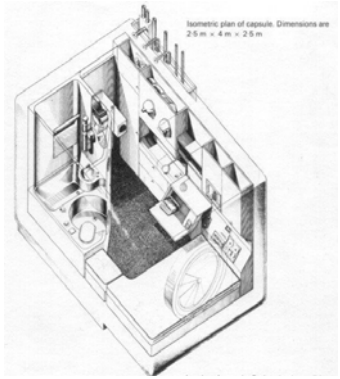


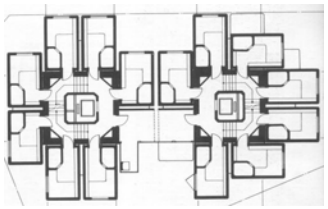


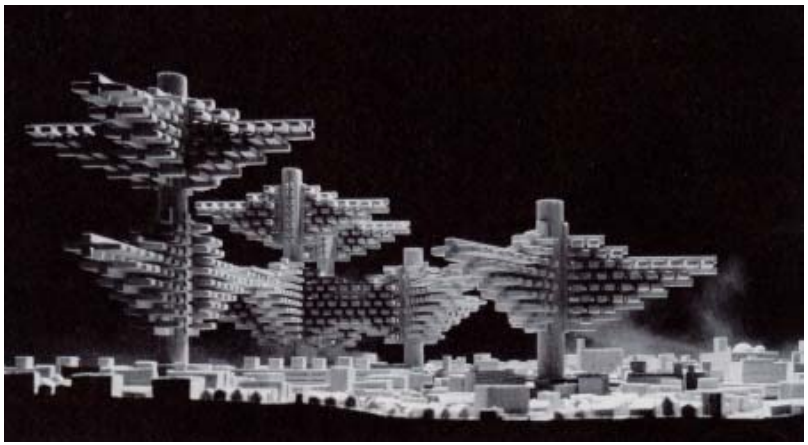
Shiokawa, Takashi. et al. (2000) **Automated construction system for high-rise reinforced concrete buildings**, Automation in Construction 9_2000. pp. 229–250

Metabolists Movements in 60s



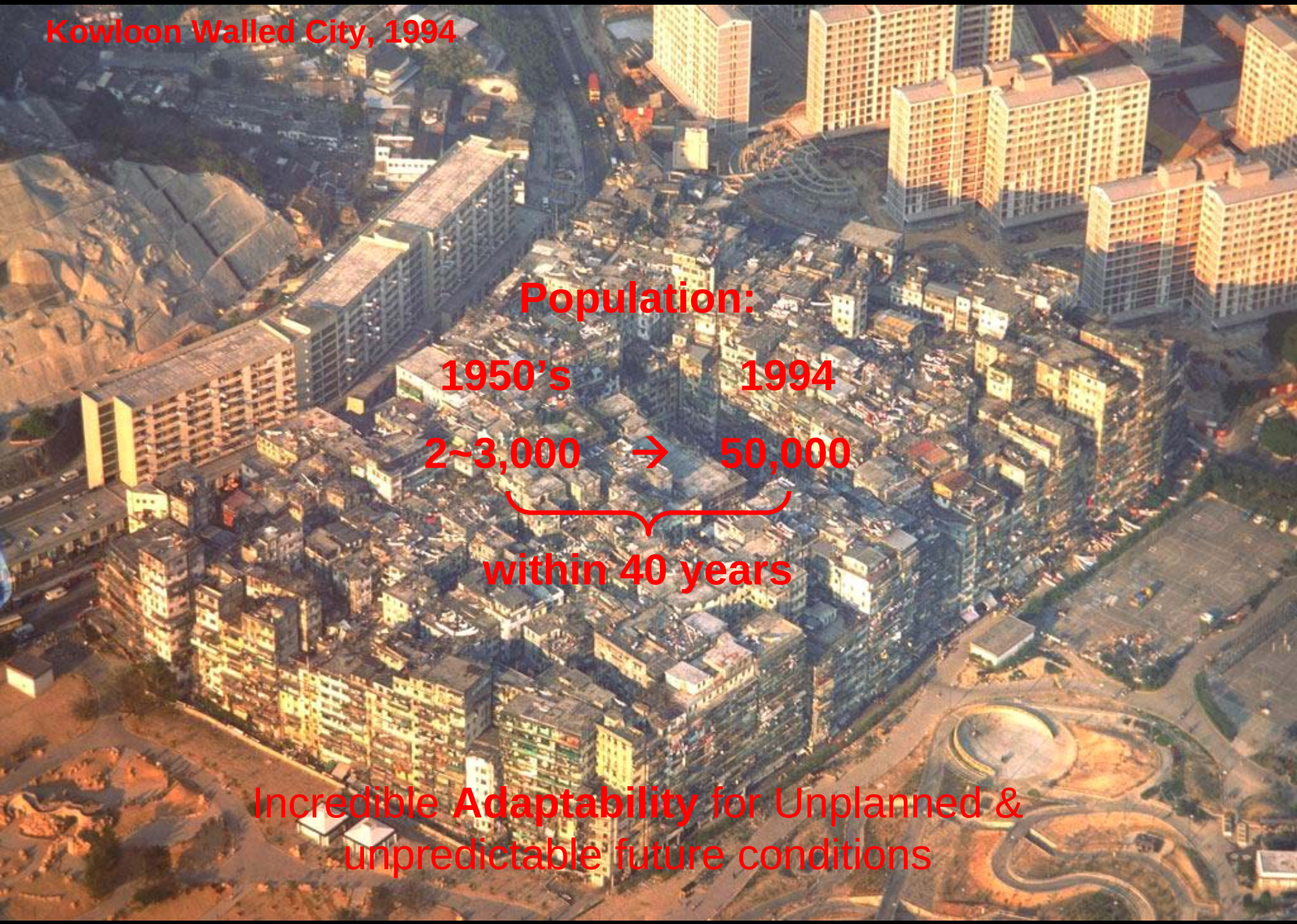




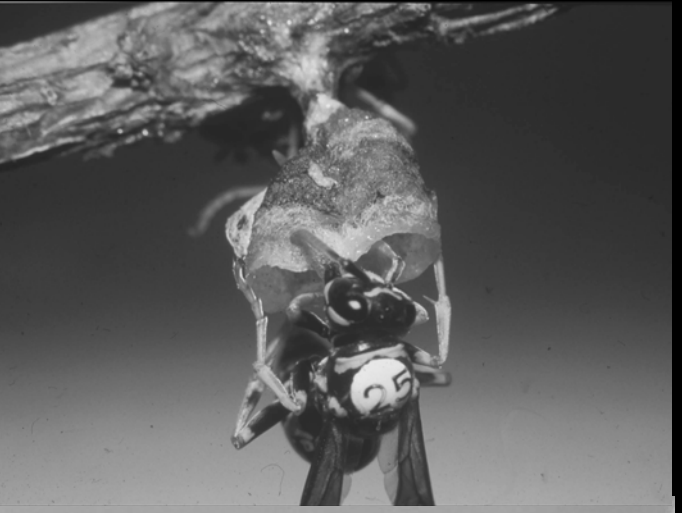


Nakagin Capsule Tower, Kurokawa, Tokyo, 1971. The Cluster in the air, Isozaki, 1962.


Kowloon Walled City, 1973
Architecture in the State of Anarchy
Population:
10,000
(From http://flickr.com/photos/57453294@N00/2238772770)



(From http://image.blog.livedoor.jp/ressbook2ch/imgs/d/6/d6694a29.jpg)



(http://en.wikipedia.org/wiki/Image:Termite_Cathedral_DSC03570.jpg)

Collective Construction:

No Leader, No Blueprints

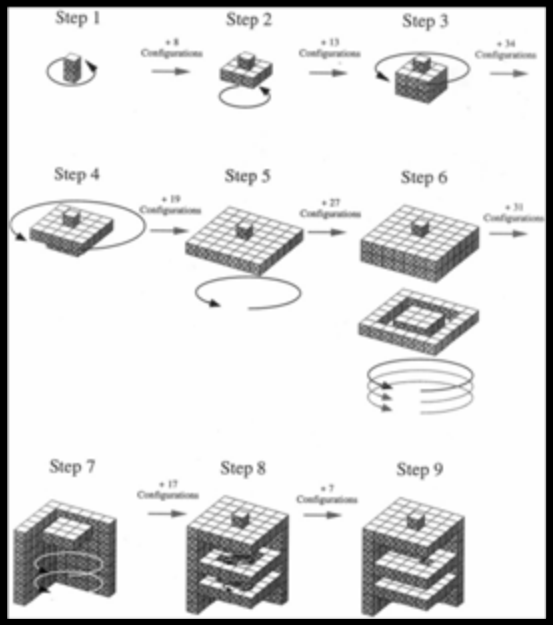
Self-organizing Structure.

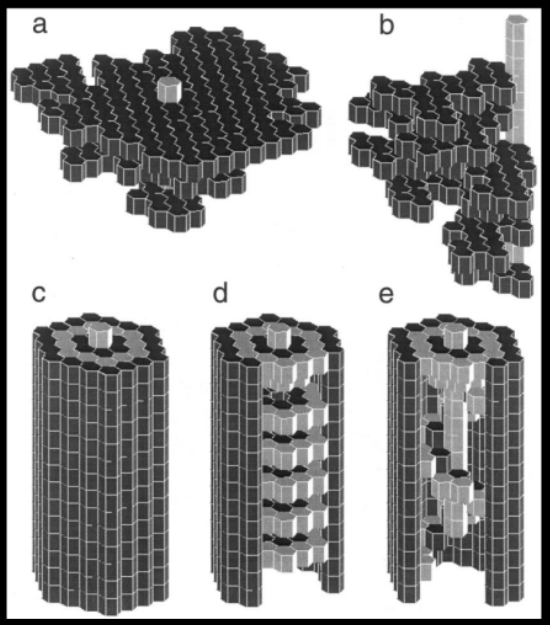
‘Design’ and ‘Construction’ phases

Simultaneous Process.

Emergence:

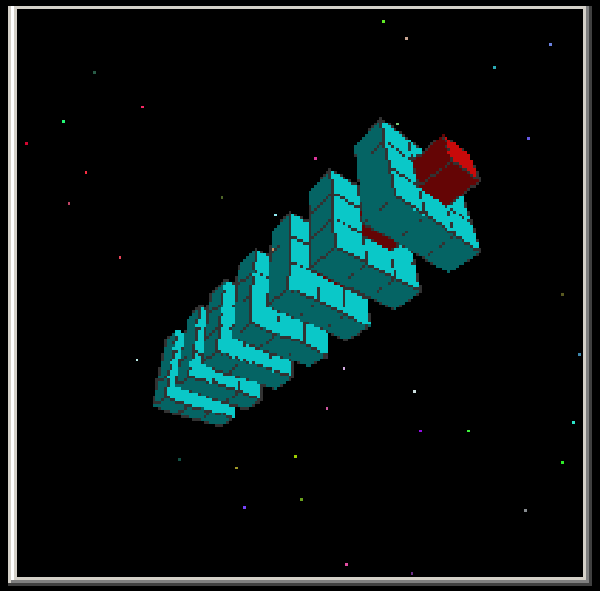
Bottom-Up, Decentralized System



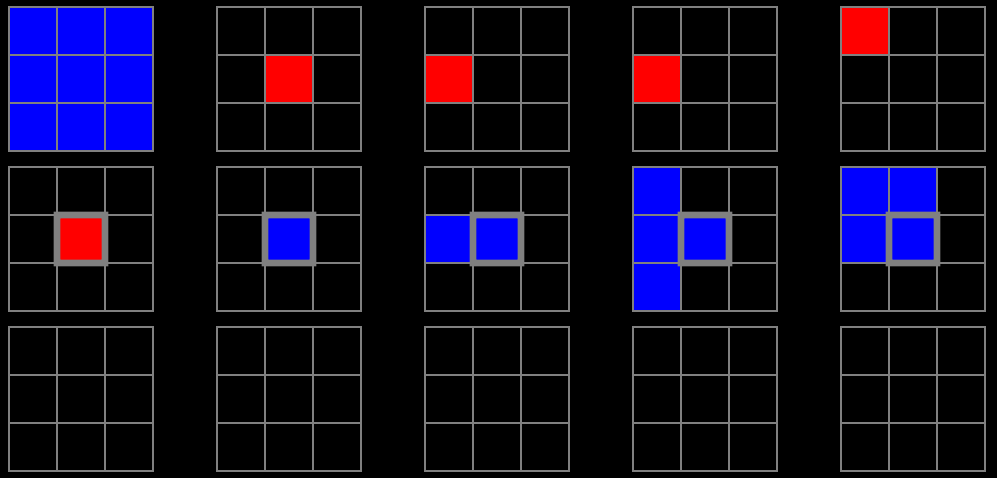


Coordinated Algorithm to simulate nest building Collective Construction behaviors by wasps

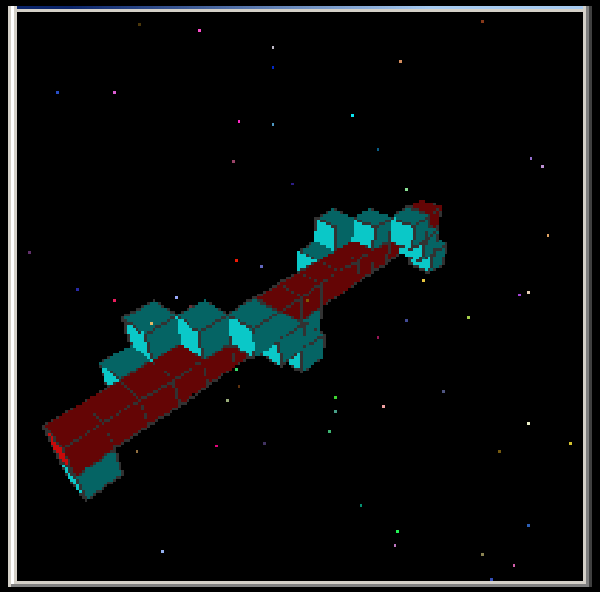
By Theraulaz & Bonabeau



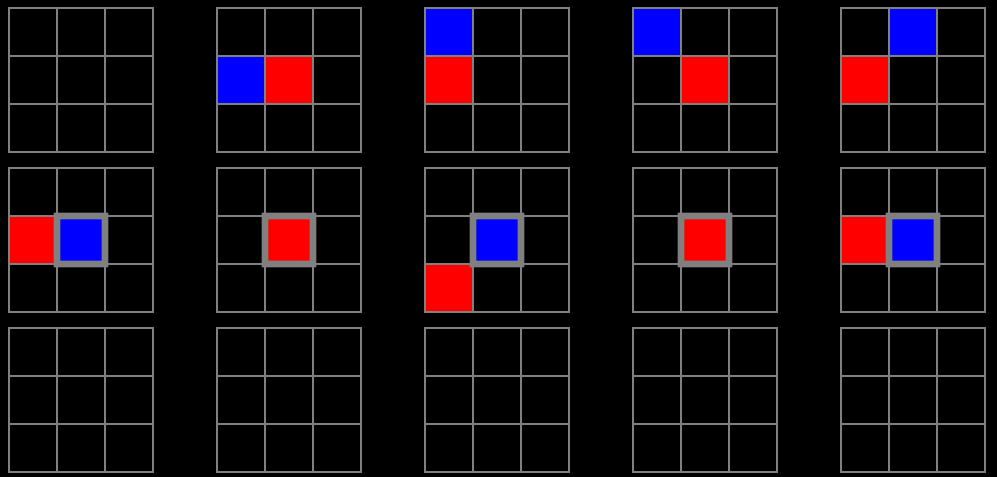
Rules produce Deterministic Structure

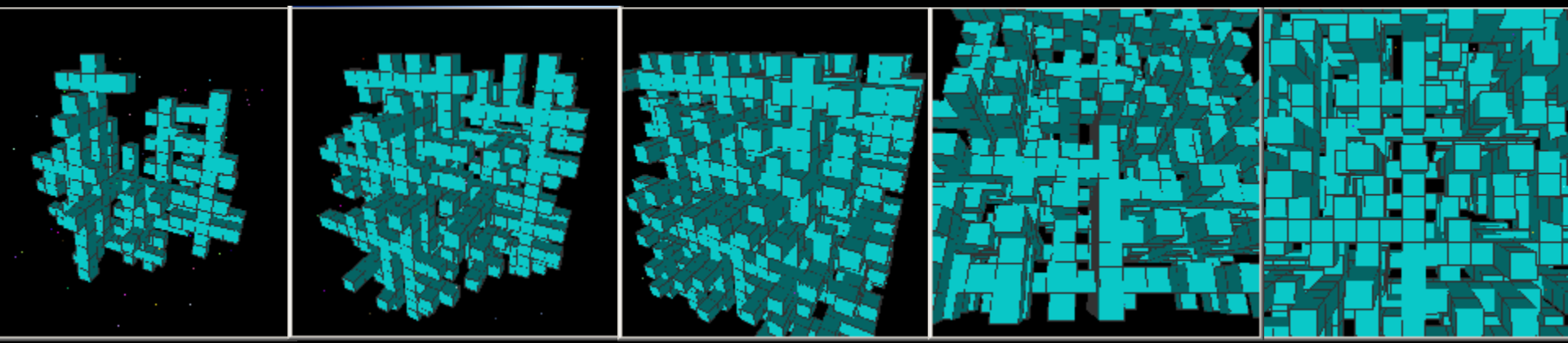


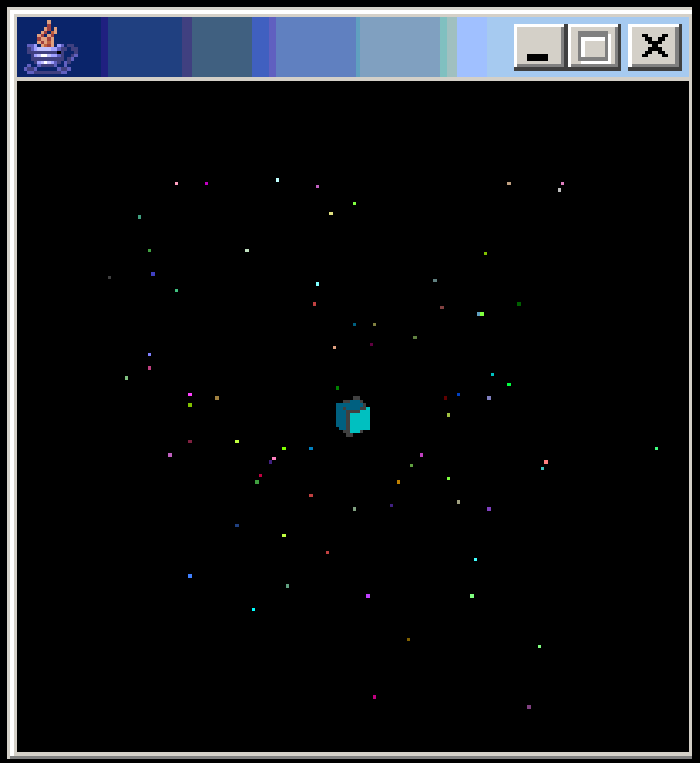
Allow 90degree Rotations

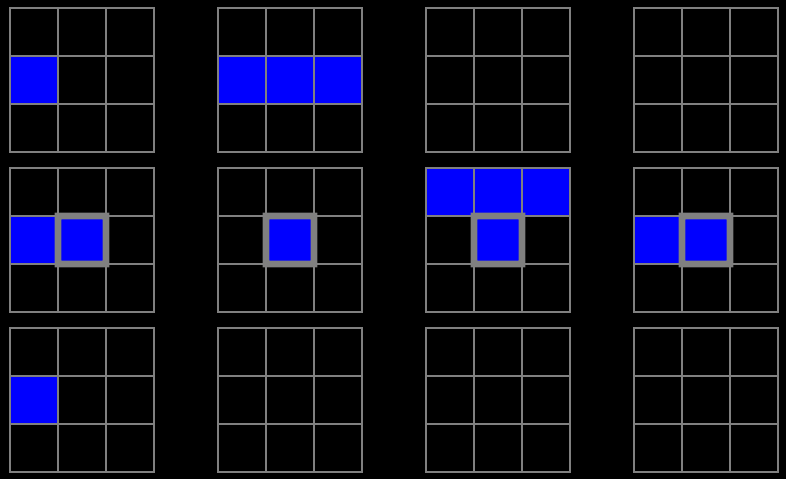


Rules produce Semi-Deterministic Structure







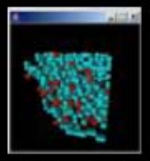


Rules produce Non-Deterministic Structures

populations of rules

Rules 0 =

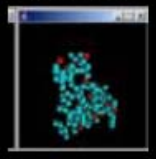
Times used = 8 6 3 6 0 0 0 0



:Fitness 0

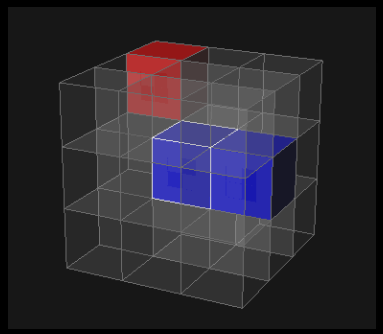
Rules 1 =

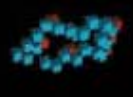
8 4 3 0 0 0 0 0



:Fitness 1

Locally defined Rules

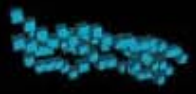




gen 7 : fit 1011

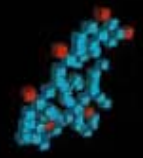
gen 15 : fit 860

gen 16 : fit 890



gen 22 : fit 1570

gen 25 : fit 1853



gen 27 : fit 2709

gen 27 : fit 2709

gen 55 : fit 1860

gen 56 : fit 1890

gen 77 : fit 1570

gen 66 : fit 2253

gen 188 : fit 10115

gen 220 : fit 17280

gen 245 : fit 19843

gen 547 : fit 21349

gen 557 : fit 24150

gen 660 : fit 27151

gen 880 : fit 48109