

Computational Media Research

CMPM 202, W2020

Week 1, Thursday: You and your research

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Course Website & Slack Channel

Website:

https://creativecoding.soe.ucsc.edu/courses/cmpm202_w20

Slack:

<https://ucsc-cmpm202-w2020.slack.com>

Computational Media

- Richard Hamming states: "If you do not work on an important problem, it's unlikely you'll do important work." What are the most important open questions in the area of CM that you are most drawn to? What are the open challenges in this area? What would constitute a breakthrough? Why would it be a breakthrough? How would it change the field, the world?
- What are the open questions in CM related areas? HCI? ML? Creative Computing? Media Arts? Media Studies / Critical Theory?
- Hamming describes some of his strategies (interdisciplinary work, collaboration, ego/humility) for discovering important problems. What are your strategies for deciding what's interesting or important? What do you think about Hamming's discussion on control and the tension between practical and exploratory work (open and closed doors)?

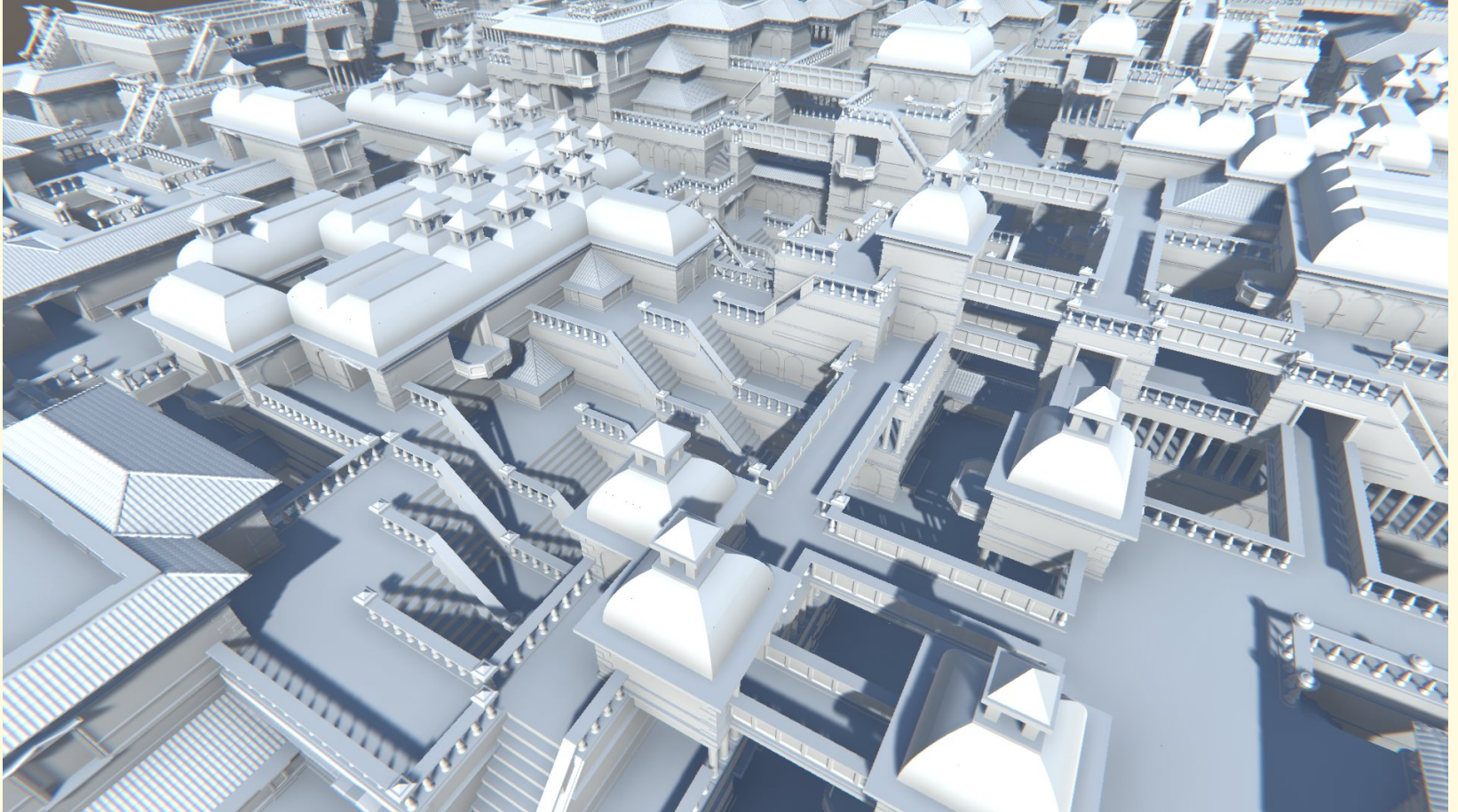
Computational Media

- Hamming stresses the importance of “selling” your ideas. Can you articulate why you are interested in your area of research? Is it important to articulate your interests? To focus on challenges and opportunities? To taxonomize the various research directions that make up a field? Is there something distinct about the research goals and methods for your area?
- Does answering important questions or solving hard problems require doing more of the same, but perhaps with better resolution, more computing power, better materials, richer datasets etc, or does it require new approaches, new perspectives, new collaborations? Is it possible to envision what your contributions are before you have actually made them?

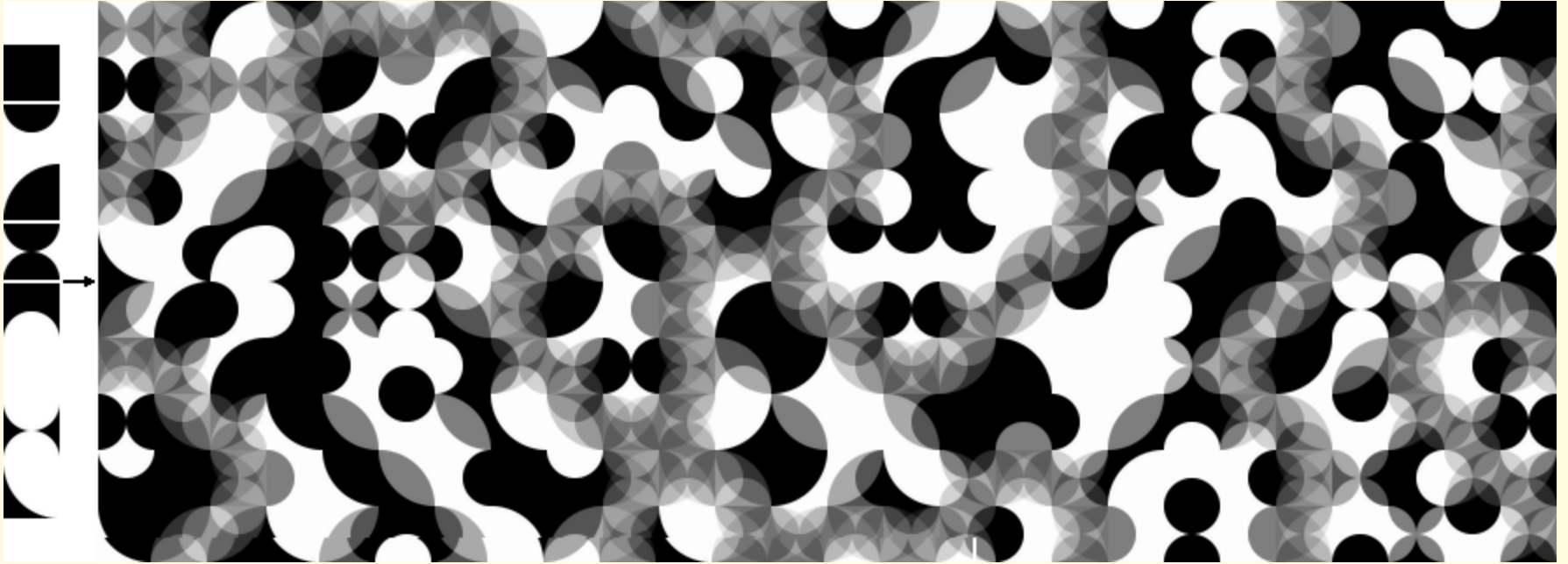
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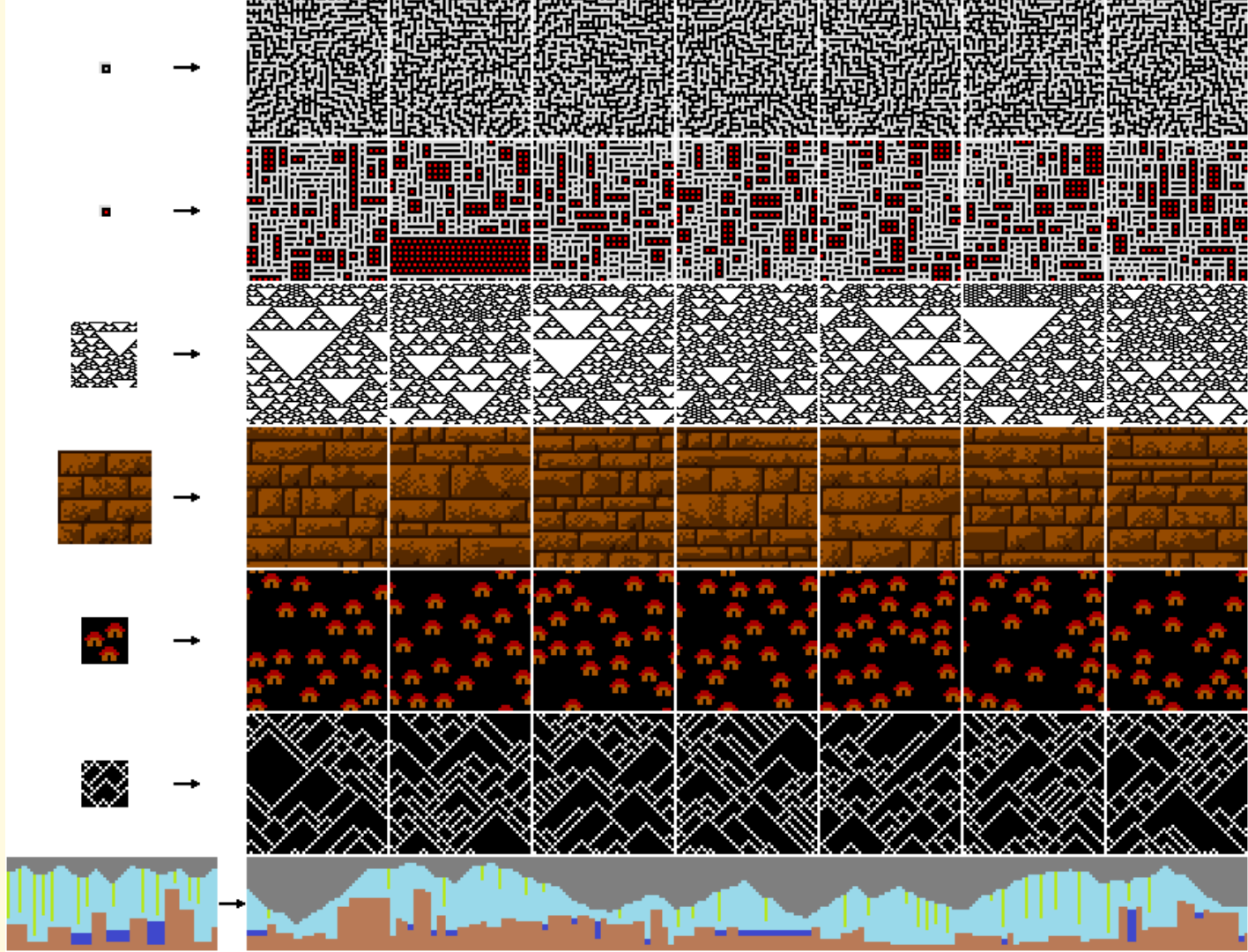
- In his story, Ted Chiang imagines new fields that emerge in response to "metahuman science", such as "artefact hermeneutics" and "remote sensing of metahuman research facilities" which attempt to make sense of what artificial intelligent agents have learned and how they function. The current interest in "explainable AI" similarly seeks to identify the relevant features used by a DLNN, for example, to classify an image, or to generate a caption. Is this a worthwhile enterprise?

Marian Kleineberg, Infinite City



WaveFunctionCollapse, Maxim Gumin





WaveFunctionCollapse



WaveFunctionCollapse

WFC generates images that are locally similar to an input image, where “local similarity” means that

- Each tile of a specified size in the generated output can be found in the input
- The distribution of output tiles is similar to the distribution tiles in the input

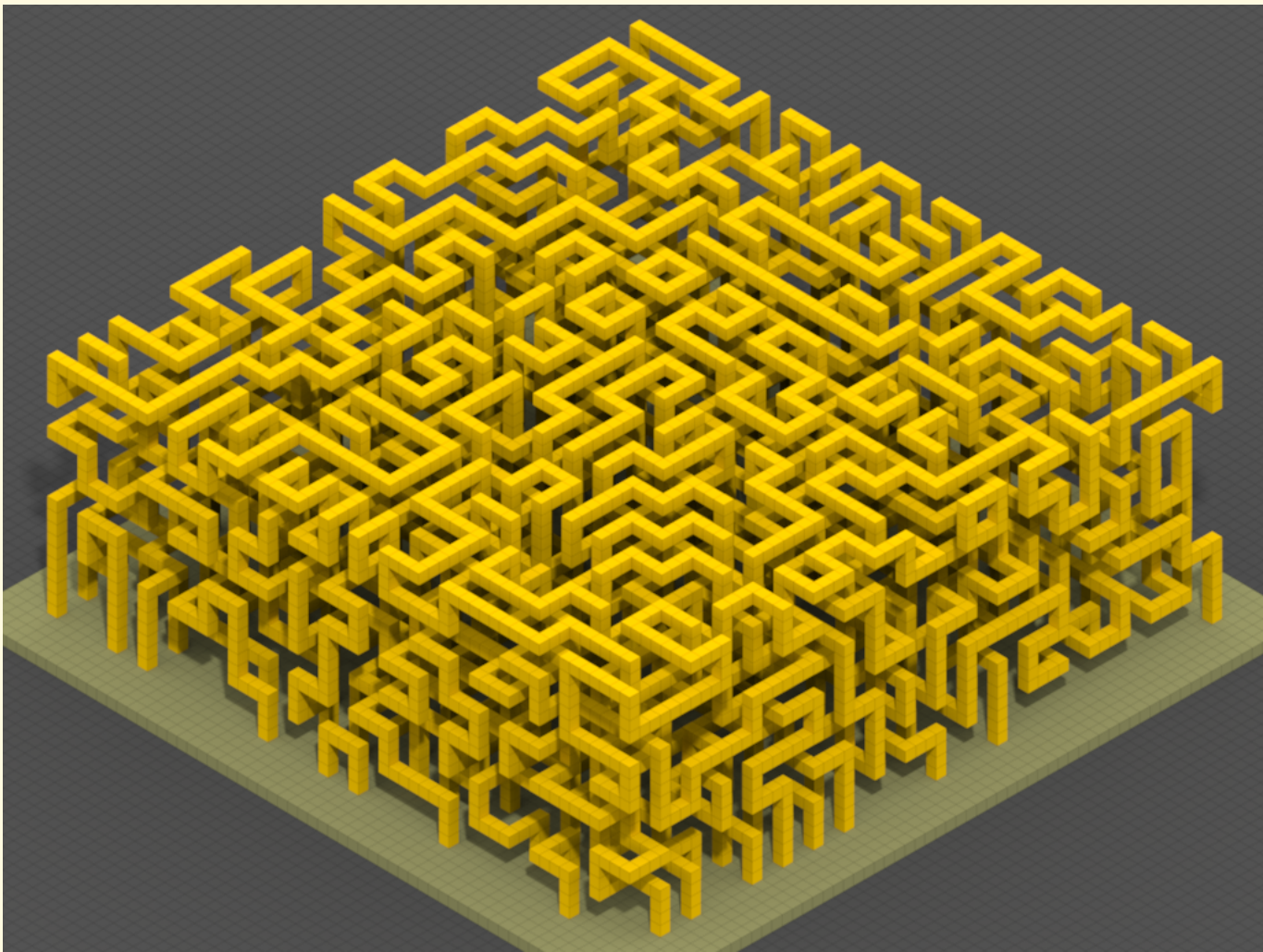
- Loosely inspired by idea of quantum superposition, where state of an atom is not defined until it is observed

- Each “slot” in an output image starts off containing every different pixel/tile found in the input image

- The output is iteratively updated by “observing” a slot and collapsing it into a definite state. At each step, choose to observe a slot from the set of slots with the *fewest* possibilities. Once a slot is defined, it may decrease the possible states of neighbor slots. Stop when all slots are defined (success), or when it is impossible to make a choice

WaveFunctionCollapse

- Can be extended to include reflections and rotations of input image/tiles
- Can experiment with different sized partitions of input
- Works with other dimensions of data (1D, 3D) and types of data (voxels, text, music, others?)
- Newer versions that include overlapping of tiles in output data, including backtracking so that algorithm doesn't get stuck in a contradictory state
- Isaac Karth and Adam Smith explore its relation to Answer Set Programming and other types of constraint-based solvers. (Also see Section 4 of the Karth & Smith paper for a good, detailed explanation of WFC.)

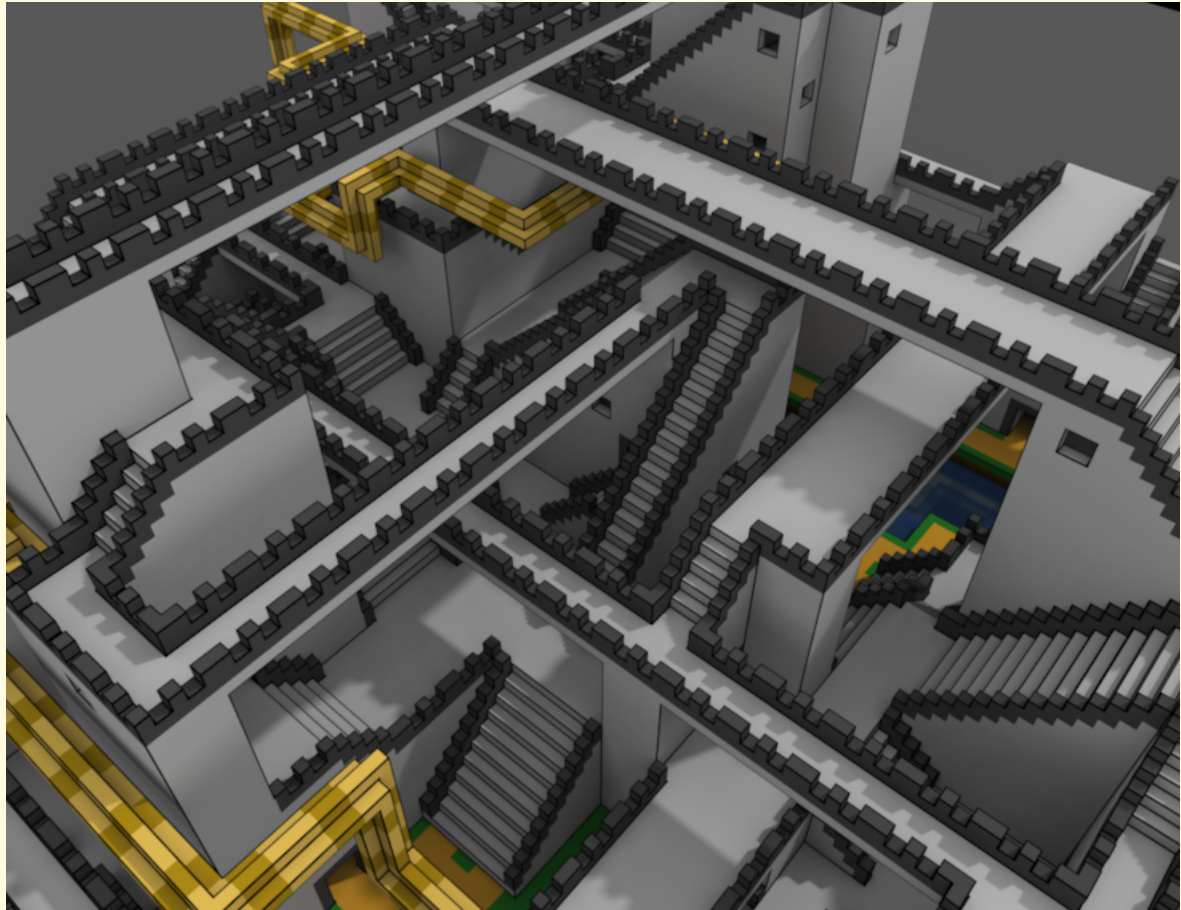


Martin O'Leary

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*** *** *** *** *** *** *** *** *** ***
*** *** *** *** *** *** *** *** *** ***
*** *** *** *** *** *** *** *** *** ***
*** *** *** *** *** *** *** *** *** ***
*** *** *** *** Let me see that would be
Of *** *** *** *** *** *** *** I wish you
Were down here with me. For you see as she
Fell past it. There was nothing else to do
So Alice had been all the way to hear
The Rabbit hole. The Rabbit hole went straight
On like a candle. Alice was not here
Before said Alice. I shall be a great
Deal too far off. I must be kind to them
Thought Alice soon began to cry again.
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Edwin Jakobs



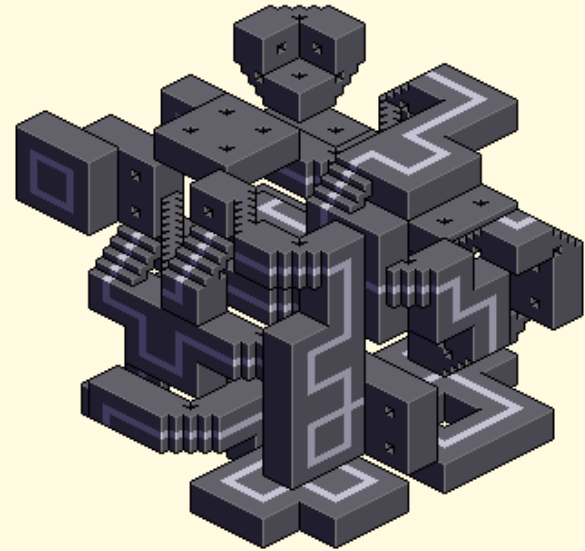
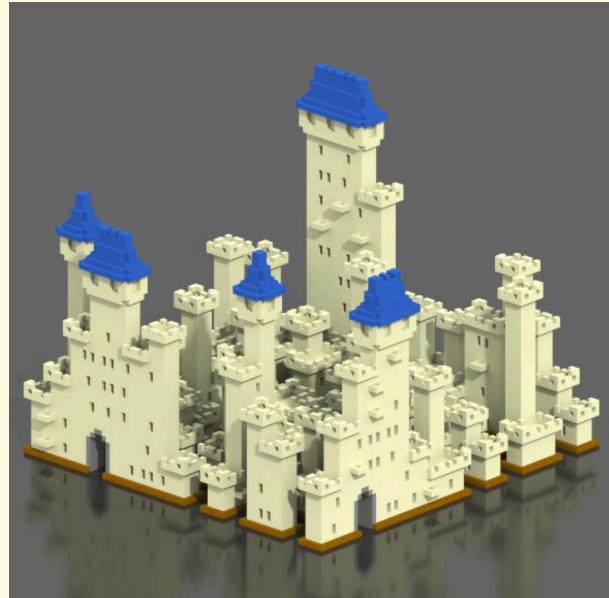
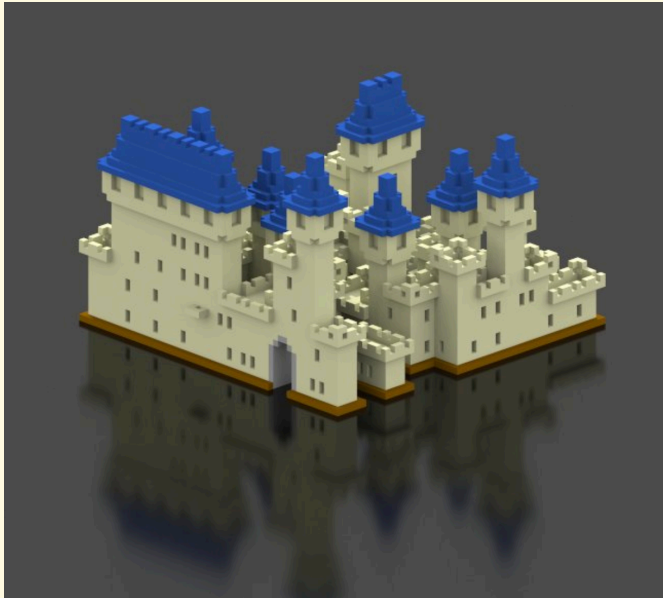


Oskar Stålberg, Bad North

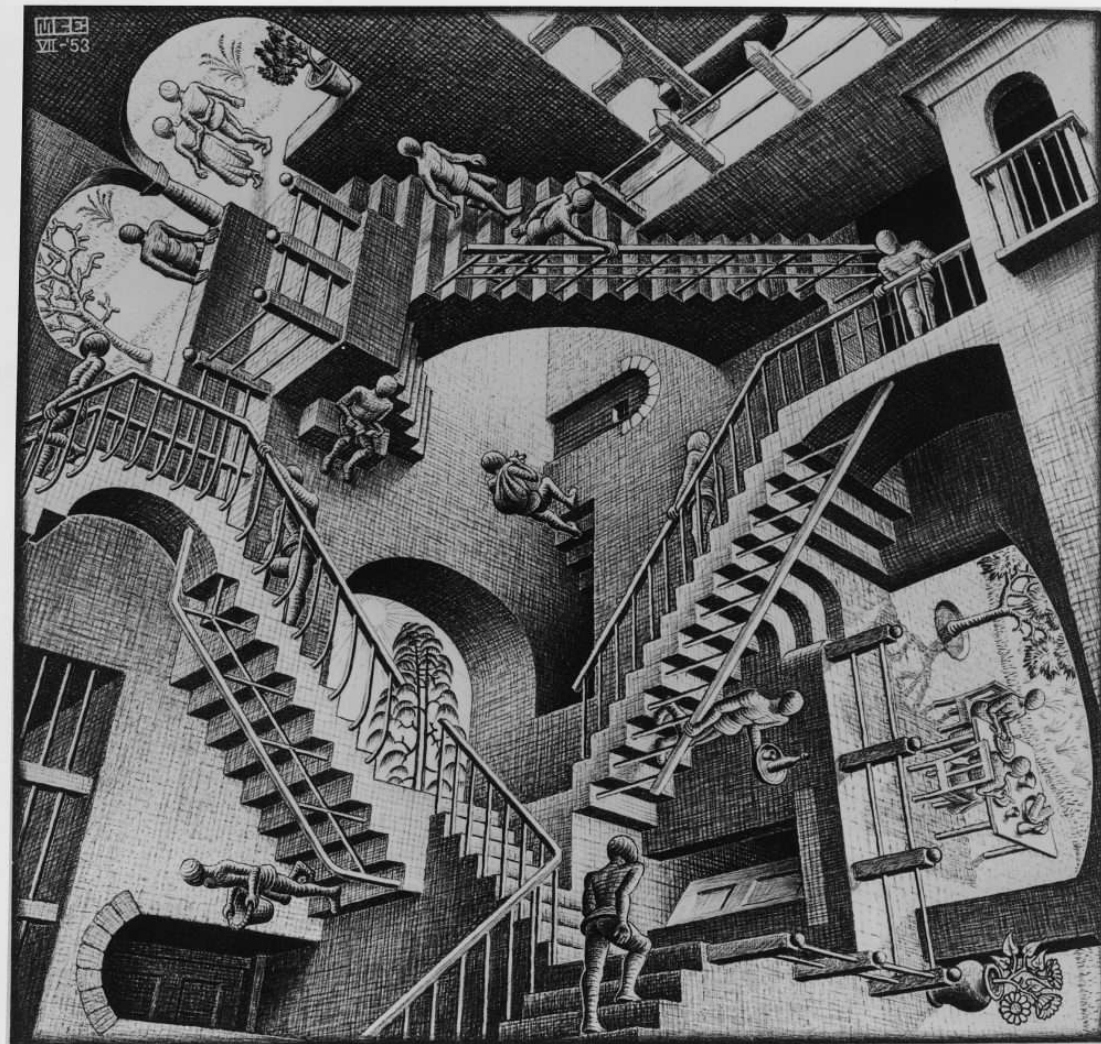
<http://oskarstalberg.com/game/wave/wave.html>

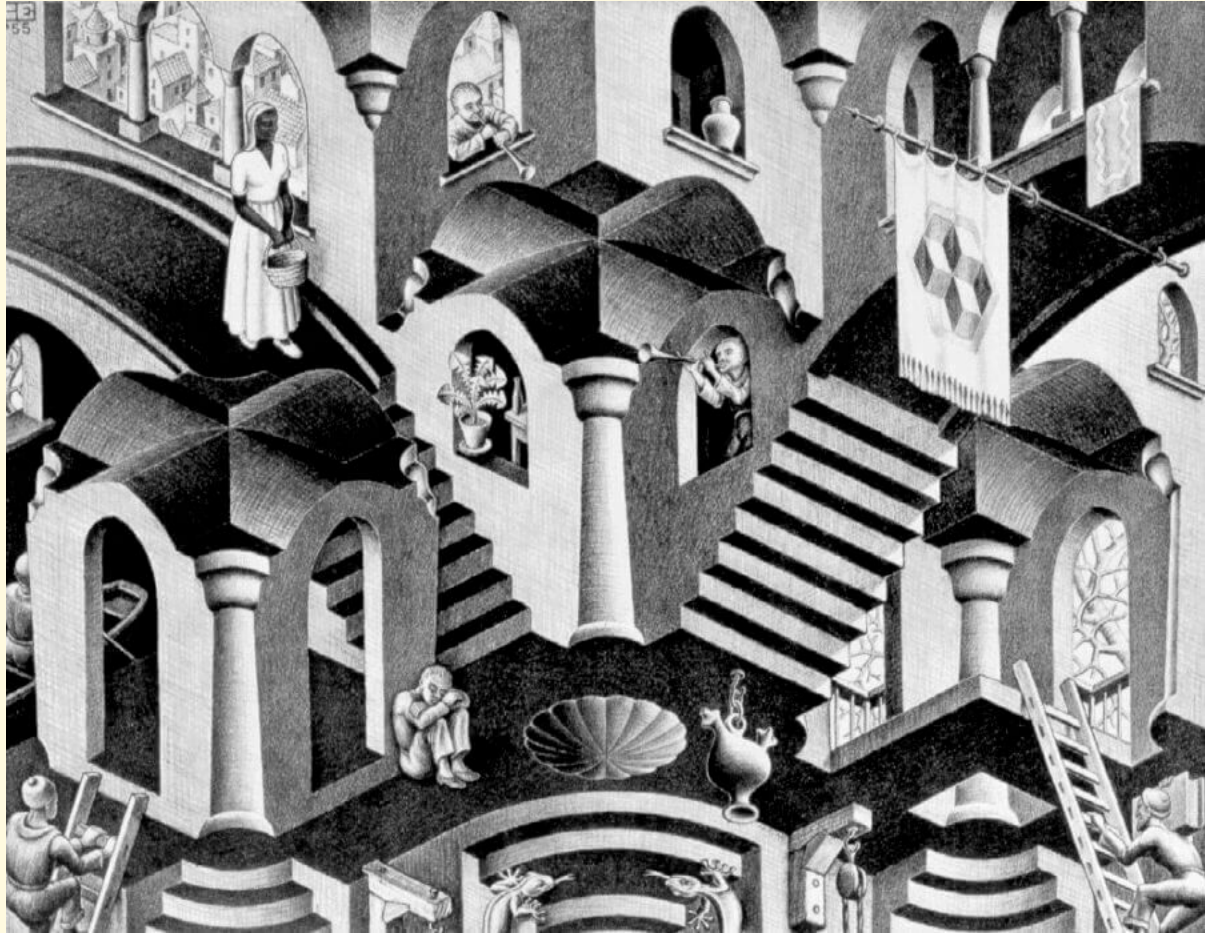


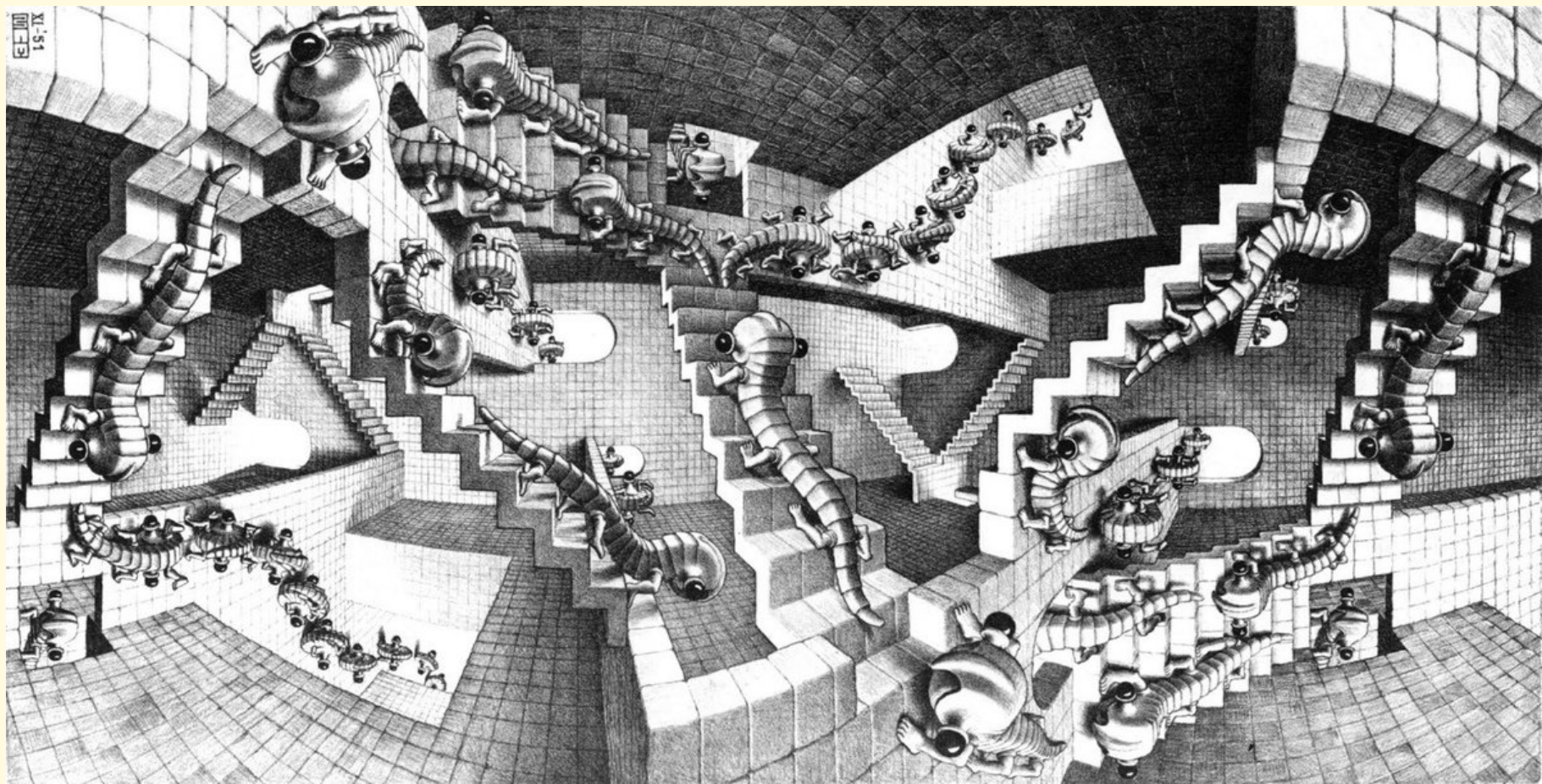
Kim Hwanhee (김환희)



MC Escher



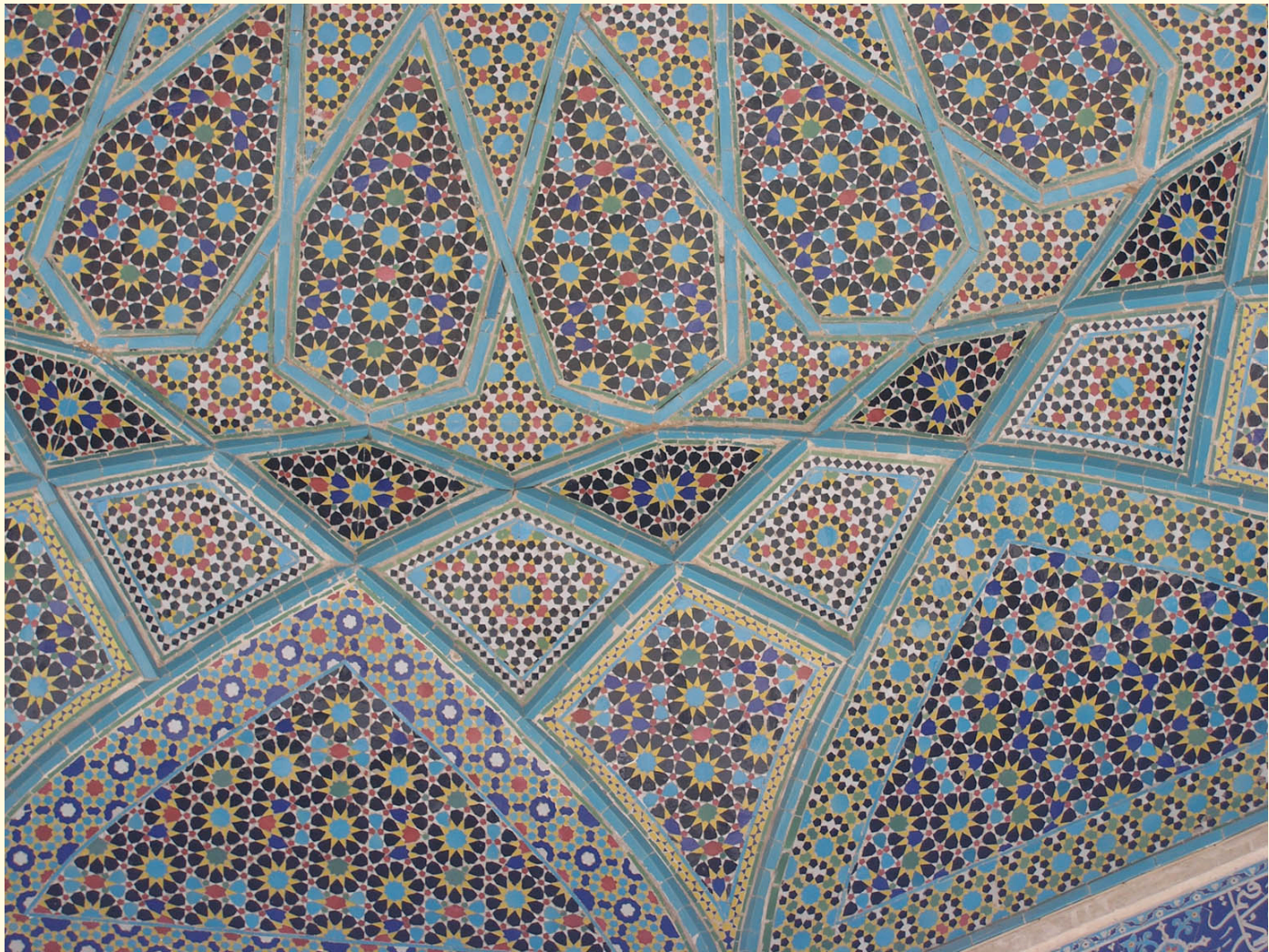




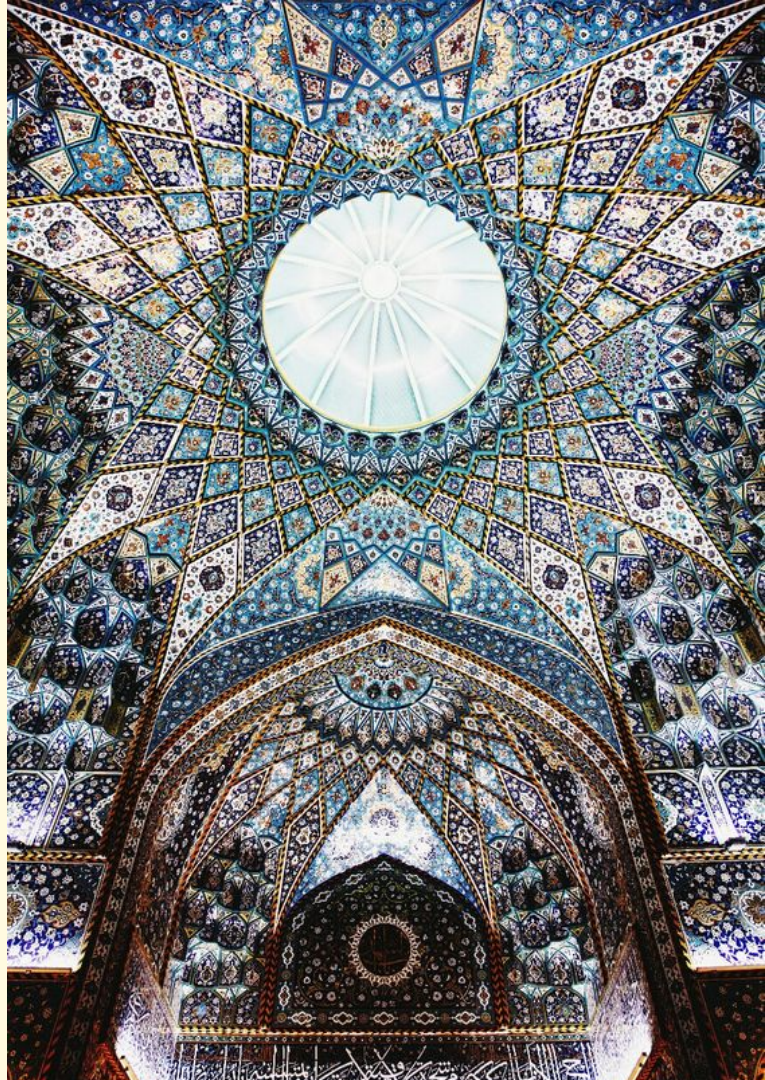
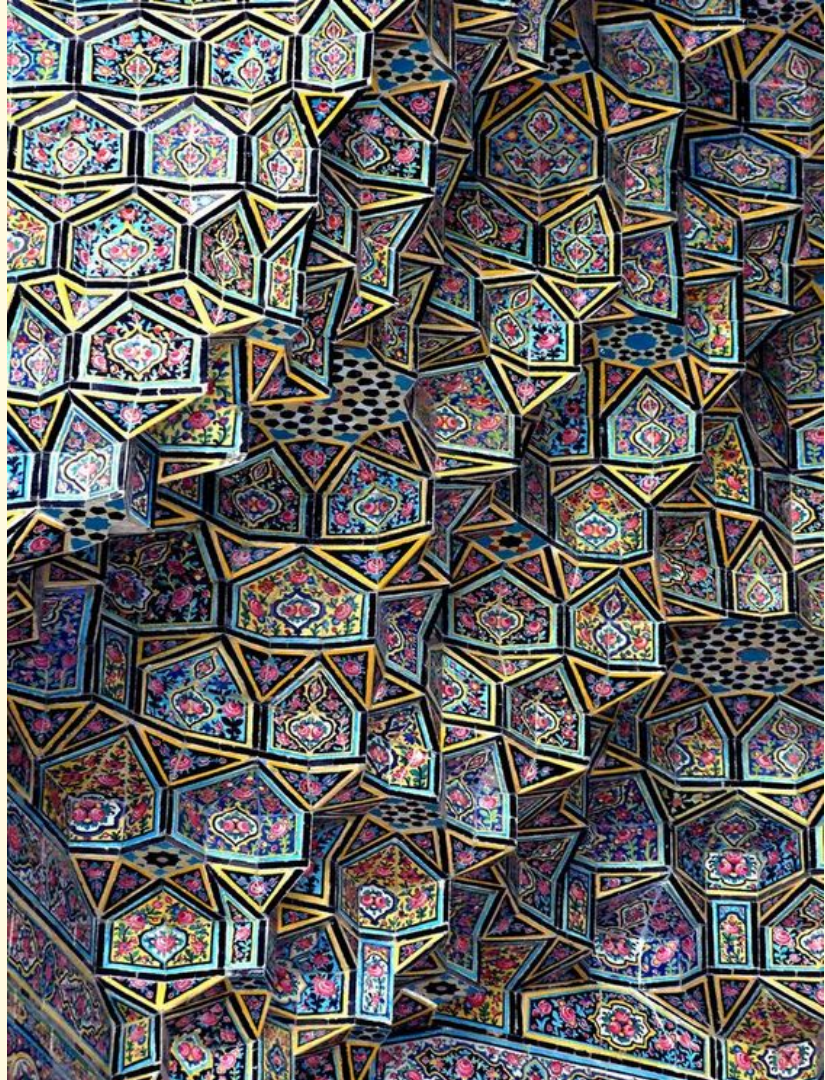
Cinta Vidal











Homework

- Read the articles/Look at code about WaveFunctionCollapse (or other generative algorithm of your choice)
- Attend Monday's CM Seminar (or watch recording)
- Project 1 due Tuesday 1/21
- Reading Responses for Tuesday's class (1/14) are due Monday (1/13) at 9pm
 - Place your writing in the Google Drive shared folder for the appropriate week
 - Read other writing and be prepared to discuss

Readings

- Excerpts from Psychopolitics, Byung-Chul Han
- Creativity Support Tools, Ben Shneiderman
- Sustaining Social Creativity, Gerhard Fischer and Elisa Giaccardi
- New Media Arts and the Future of Technologies, by Linda Candy
- Toward a Critical Technical Practice: Lessons Learned in Trying to Reform AI, Philip Agre

Links to text will be posted on the website. In addition to the readings themselves, might be useful to spend a few minutes finding out about the authors' lives and research (Google, Wikipedia, personal webpages, etc).