Puzzles, Art, and Magic with Algorithms

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Solving and designing puzzles, creating sculpture and architecture, and inventing magic tricks all lead to fun and interesting algorithmic problems. This talk describes some of our explorations into these areas.

Puzzles. Solving a puzzle is like solving a research problem. Both require the right cleverness to see the problem from the right angle, and then explore that idea until you find a solution. The main difference is that the puzzle poser usually guarantees that the puzzle is solvable. Puzzles also lead to the meta-puzzle of how to design algorithms that can design families of puzzles.

Art. Elegant algorithms are beautiful. A special treat is when that beauty translates visually. Sometimes this is by design, when you develop an algorithm to compose artwork within a particular family. Other times the visual beauty of an algorithm just appears, without anticipation.

Magic. Mathematics is the basis for many magic tricks, particularly "self-working" tricks. One of the key people at the intersection of mathematics and magic is Martin Gardner, whose work has inspired several of the results described here. Algorithmically, our goal is to automatically design familes of magic tricks.

This is joint work with Martin Demaine and several others.