Generalized Pascal's Triangle

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Pascal's Triangle is a commonly used shape in mathematics. In this paper I interpret Pascal's Triangle as an automaton for N dimensions. This algorithm is useful as a part of simulations for studying observer selection effects in Path Reference Classes.

Pascal's Triangle is often depicted the following way:

```
                        1
                  1           1
            1           2           1
      1           3           3           1
1           4           6           4           1
```

I will use a slightly different version:

```
0        0        0        1        0        0        0
    0        0        1        1        0        0
0        0        1        2        1        0        0
    0        1        3        3        1        0
0        1        4        6        4        1        0
```

Here, the triangle can be thought of as 1-dimensional slices of cells stacked on top of each other, where every odd slice is translated such that each cell's position is in the center between its parents.

For N dimensions, I generalize the same way by moving the cuboid cells:
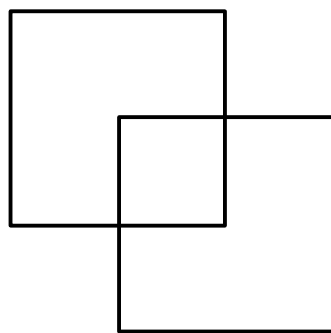
This algorithm has some significant mathematical properties:

- Counting the number of paths
- No centered parent cell
- Self-similar by translation
- Isomorphic every even time step to unnormalized Gaussian blur