SIAS models as geometric realizations

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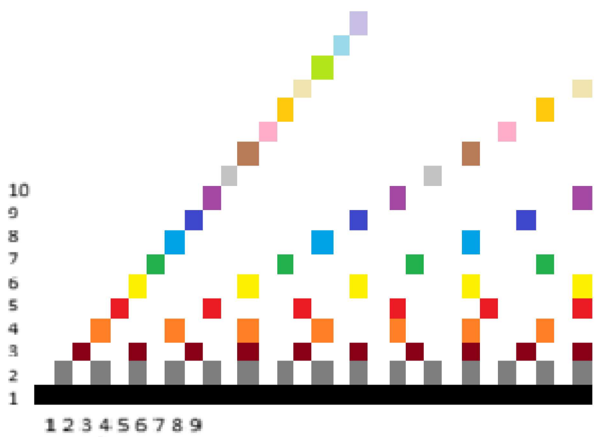
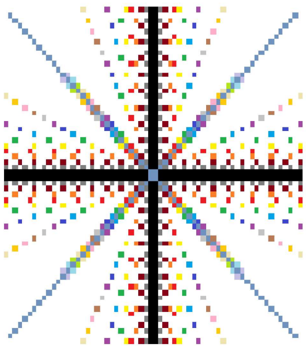
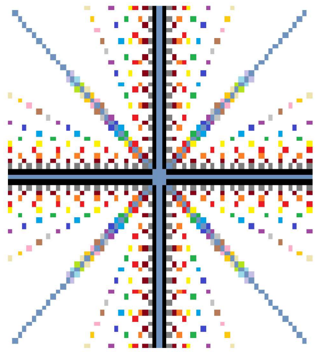
This is just a short simple description of SIAS with visuals and explanations. It allows arithmetic to be visualized in a novel way, and has the potential to be used as a tool to help people visualize math and possibly find new invariants and proofs otherwise obfuscated under symbolic first mathematics.

In reference to the SIAS document, the following object represents SA;

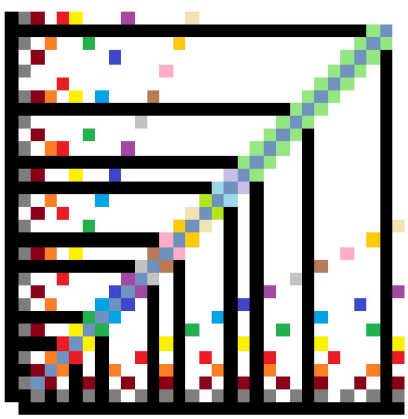


It's a relatively simple realized object in which each layer is represented by an additive series. In the above photo, the solid black line represents 1+1+1+1… and the grey line above it represents 2+2+2+2+2….. this simple rule creates the infinite object. The symbolic value of the numbers has been color coded for easy visualization. Several arithmetic symbolic relationships can be derived from this object. However first we will extend the object into a full 2d object, this creates two minimal configurations where, if expressed onto a lattice, the null set will either coincide with a lattice point or centered between lattice points.





This creates two distinct minimal band gaps (X,Y=1 or 2, and Diagonals=√2). This new representation of SA is SIAS. Now using SIAS and SA I will show arithmetic relationships. The first is primes.

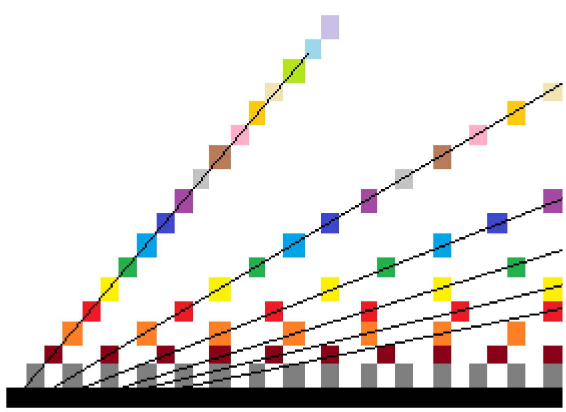


Primes form empty sets (Now represented by black columns and diagonals) that are not occupied by other bits. The image on the right shows the need for an empty set, otherwise no diagonal visually occurs at n=1, even though it is there. Injecting the empty set removes the singularity that occurs at n=1 for diagonal bands. Columns also show factorization. Using the “12” column as a representative sample;

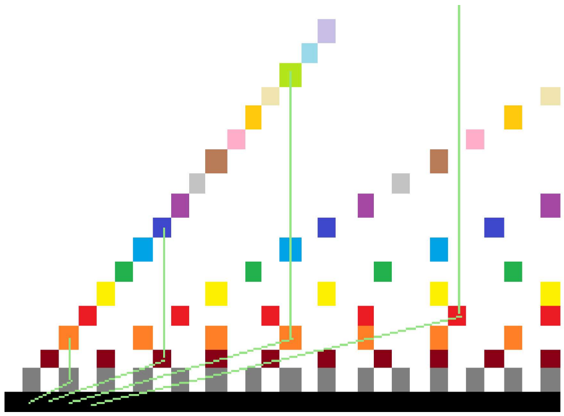
12 is the brown bit, 6 is the yellow bit, 4 is the orange bit, 3 is maroon, 2 is grey, 1 is black. This accurately represents the factorization of 12 and encodes all relative factors and composite numbers that structurally build 12. Column comparison also correctly shows GCD and LCM as demonstrated below;

In order those are the 6,12, and 16 columns, the GCD between 6 and 12 is the yellow bit, and the LCM is the grey bit. Between 12 and 16 the orange bit(4) is the highest bit shared between columns (the GCD), and similarly the smallest bit that isnt 1 is the LCM(2).

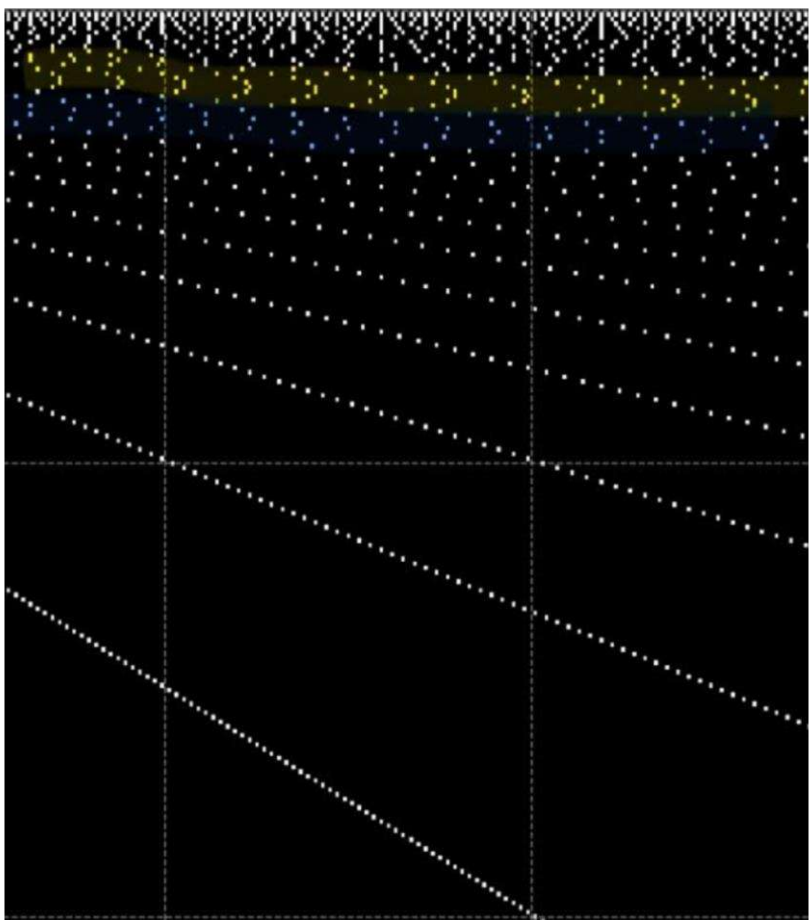
All numbers are represented exactly once along a diagonal line whose slope is equal to 1/n, where n is the origin of the slope, as shown in the following photo.



This is much easier to see on a lattice but is still easily represented here. Natural squares also show up.



This √n region creates a cresent arc as n increases.



This object has the potential to identify new and novel invariants which are otherwise obscured under strictly symbolic first mathematics.

Visual relationships such as the maximum arm length of a given section corresponds to a distance n from the origin, and the perfectly symmetrical arms alonged with the perfectly straight columns corresponds to a twin prime invariant. These twin primes will be maximally isolated from adjacent primes.