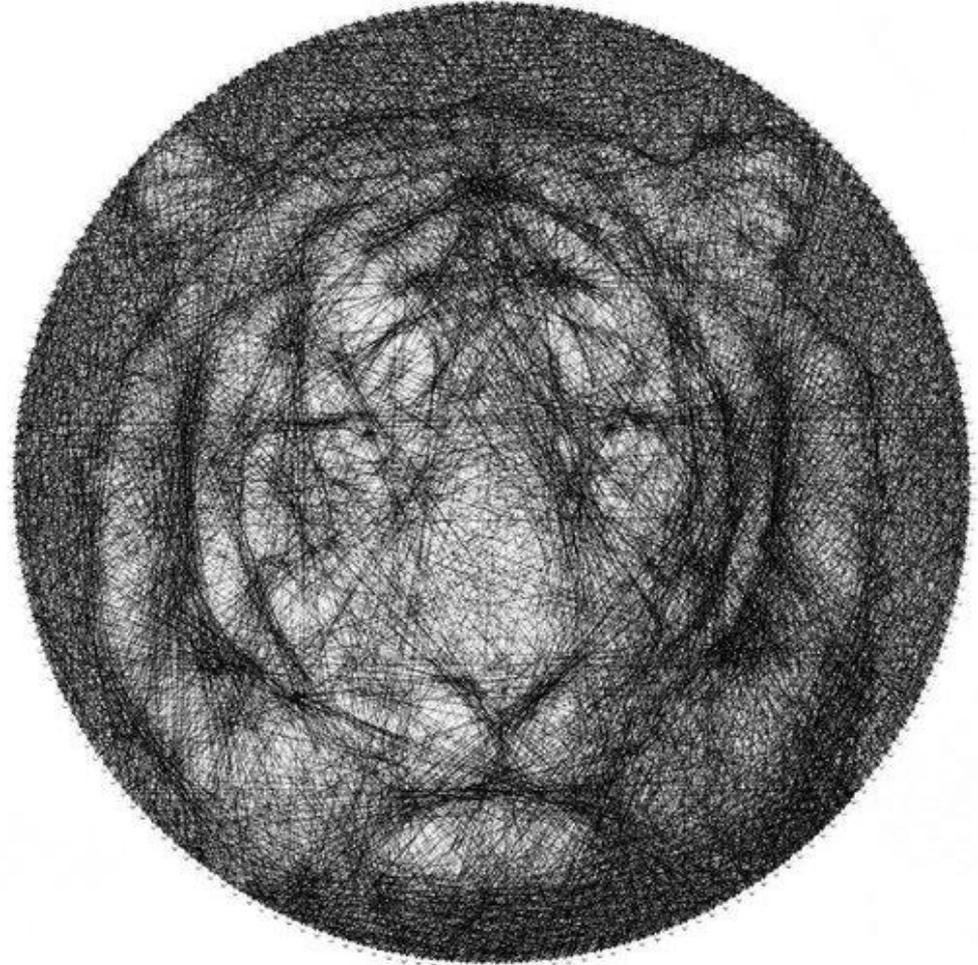


String Art

Sculpture I found online by
Andrey Saharov

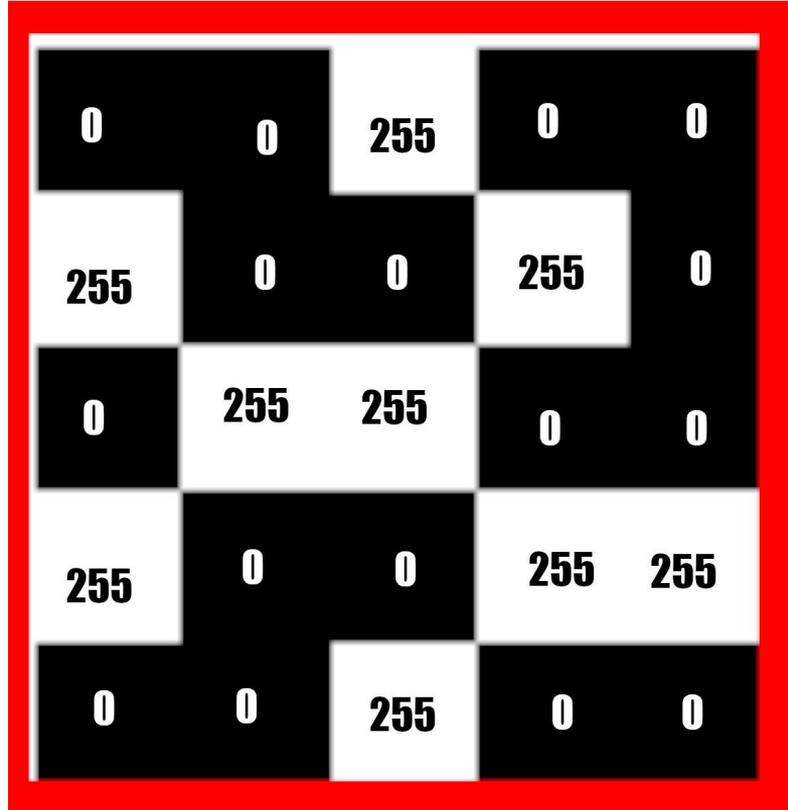
200 pegs



Step 1: The Canvas Vector Space

Have your canvas be an $N \times N$ pixel blank image for whatever resolution n you want. For example, we can see $N=5$ to the right.

This can be interpreted as a $5 \times 5 = 25$ -dimensional vector space, \mathbb{R}^{25} .

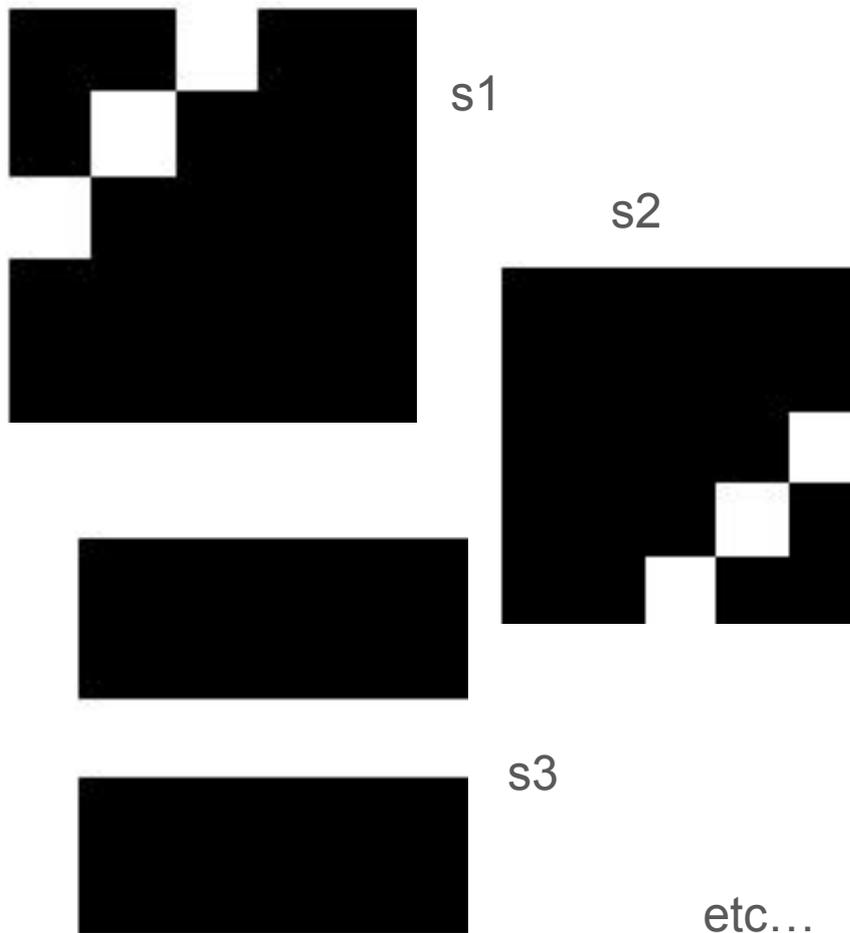


Step 2: The String Subspace

We can draw every possible string in our canvas and reinterpret the data from that drawing as a vector inside \mathbb{R}^{25} , like so.

The vectors that we get from every pair of pegs can be put together to form a basis of a subspace.

If there are P pegs, there are $P*(P-1)/2$ strings.

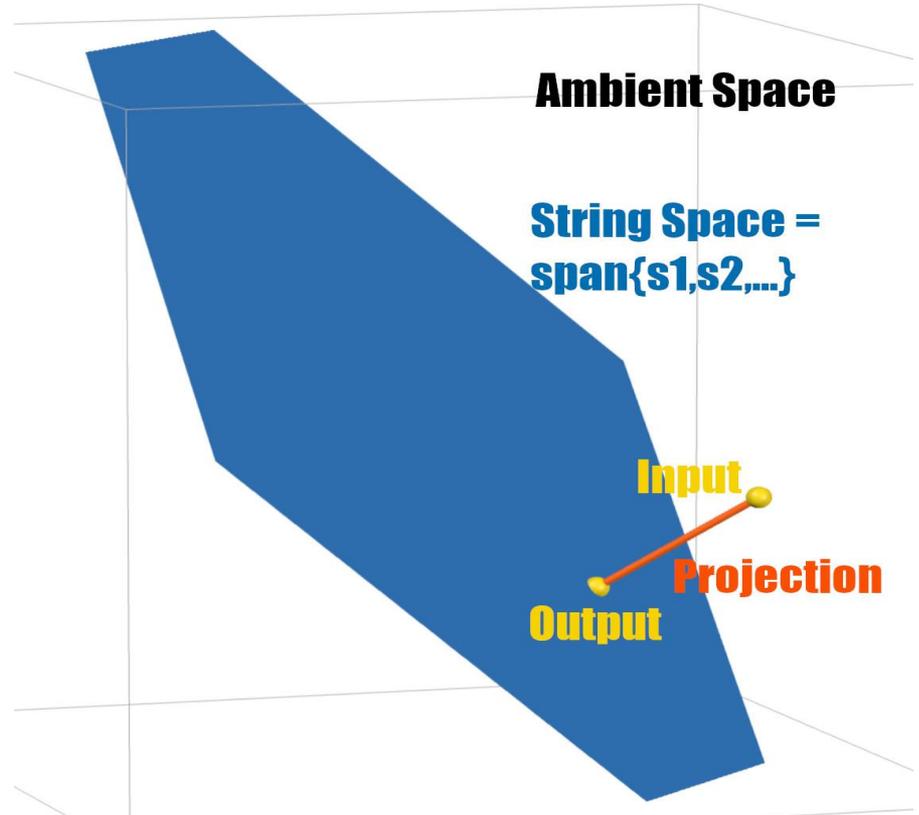


Step 3: Creating the Projection Function

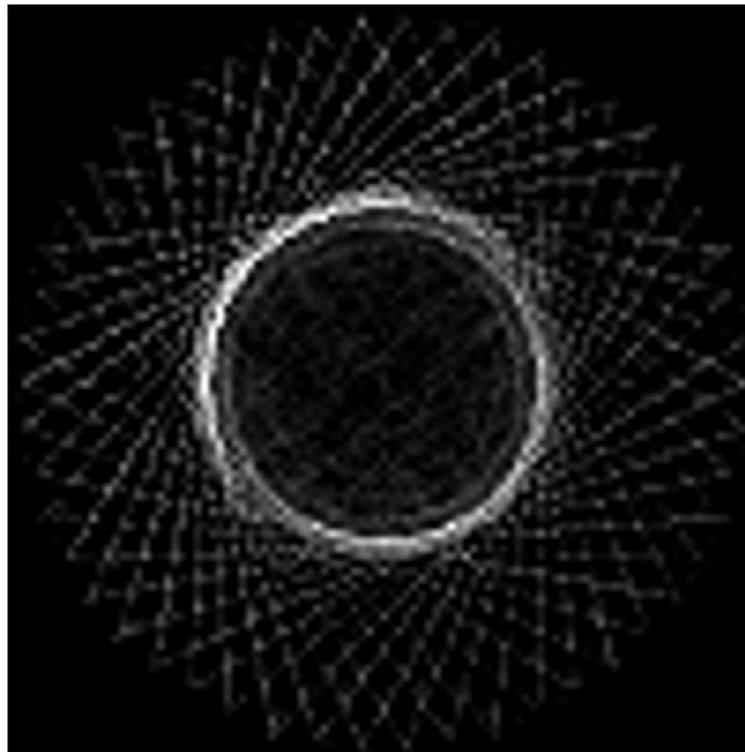
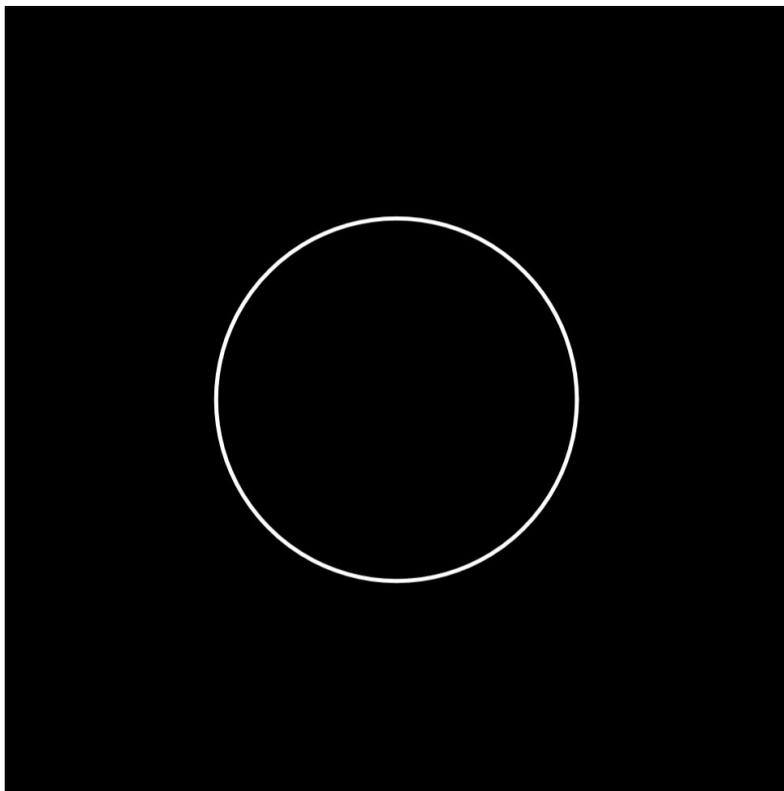
We can take our basis B for the string subspace and use it to create a projection matrix.

This projection matrix takes the input of any image and outputs its closest vector in the string subspace.

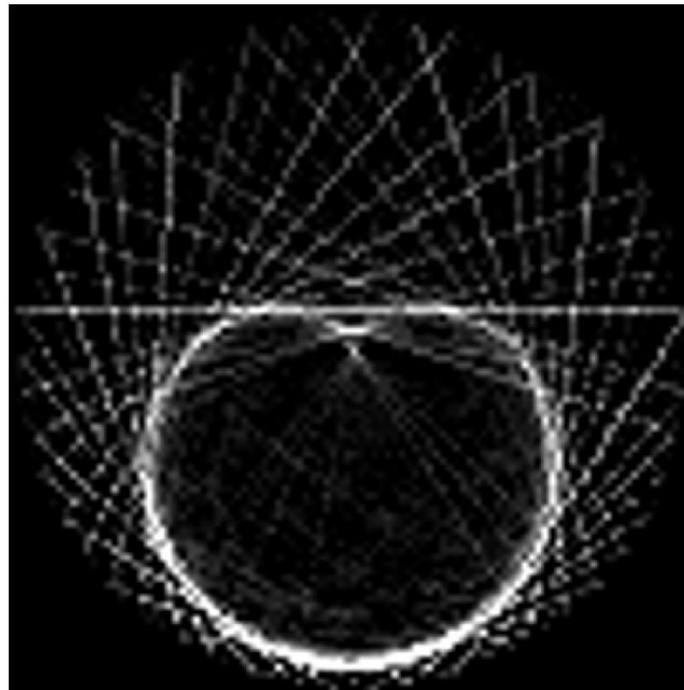
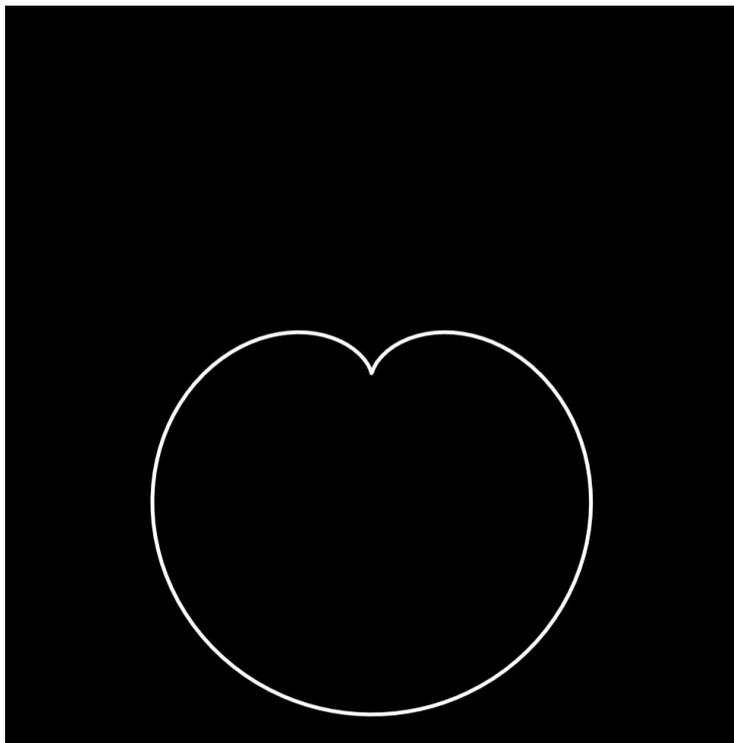
It takes an image and converts it to a linear combination of strings!



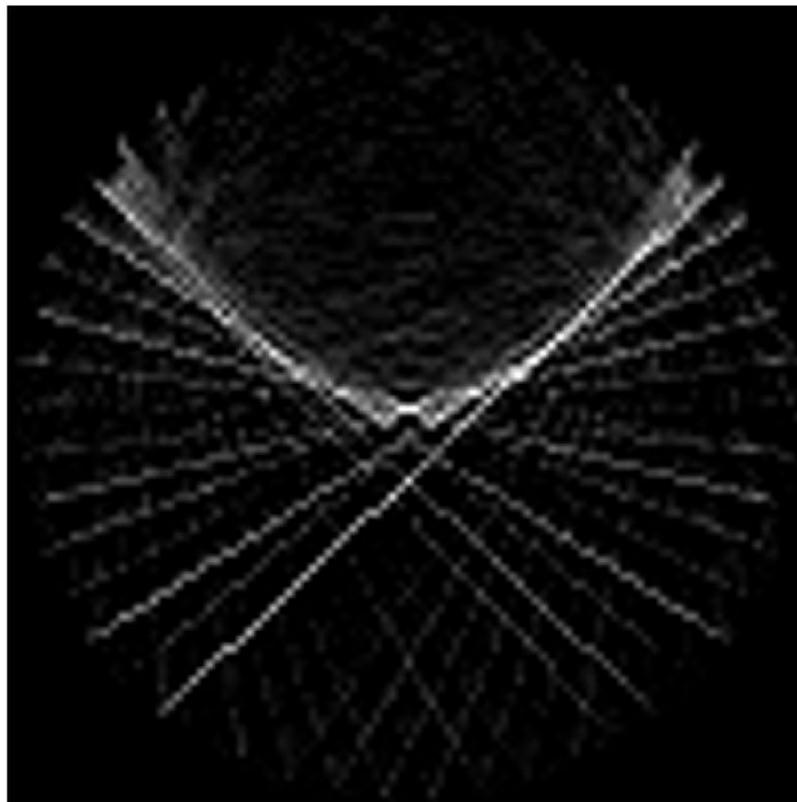
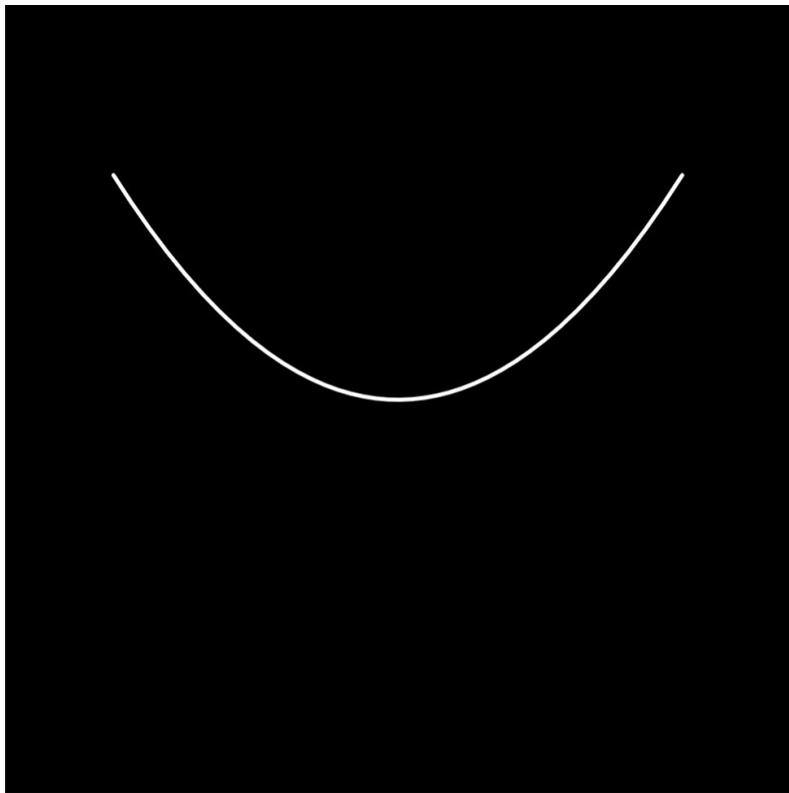
Examples: $N=100$, $P=50$



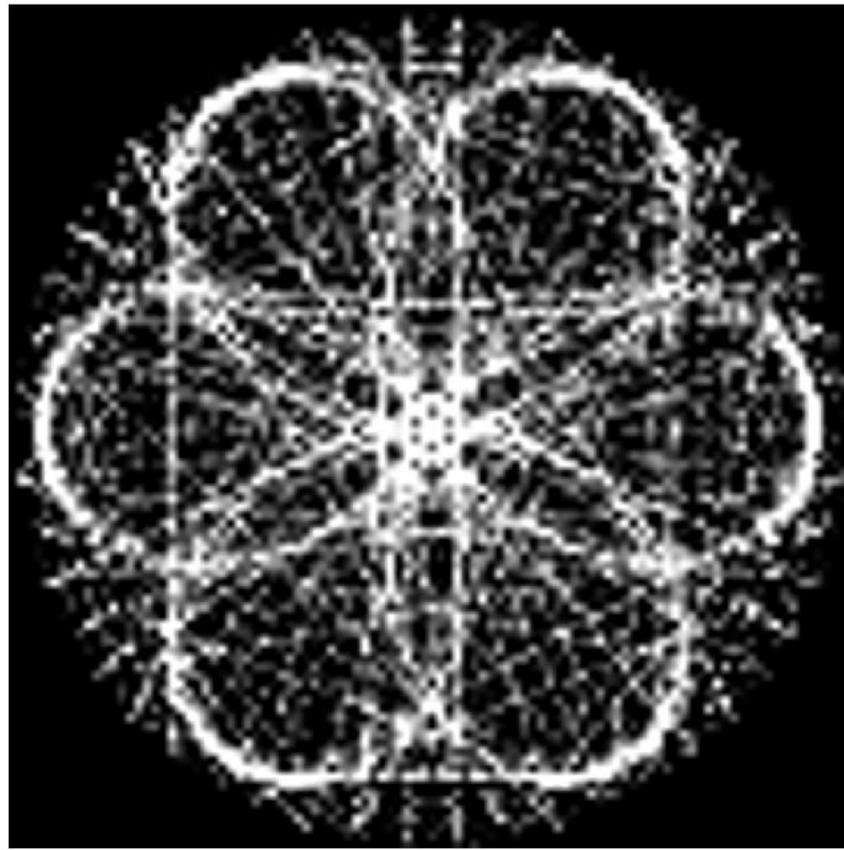
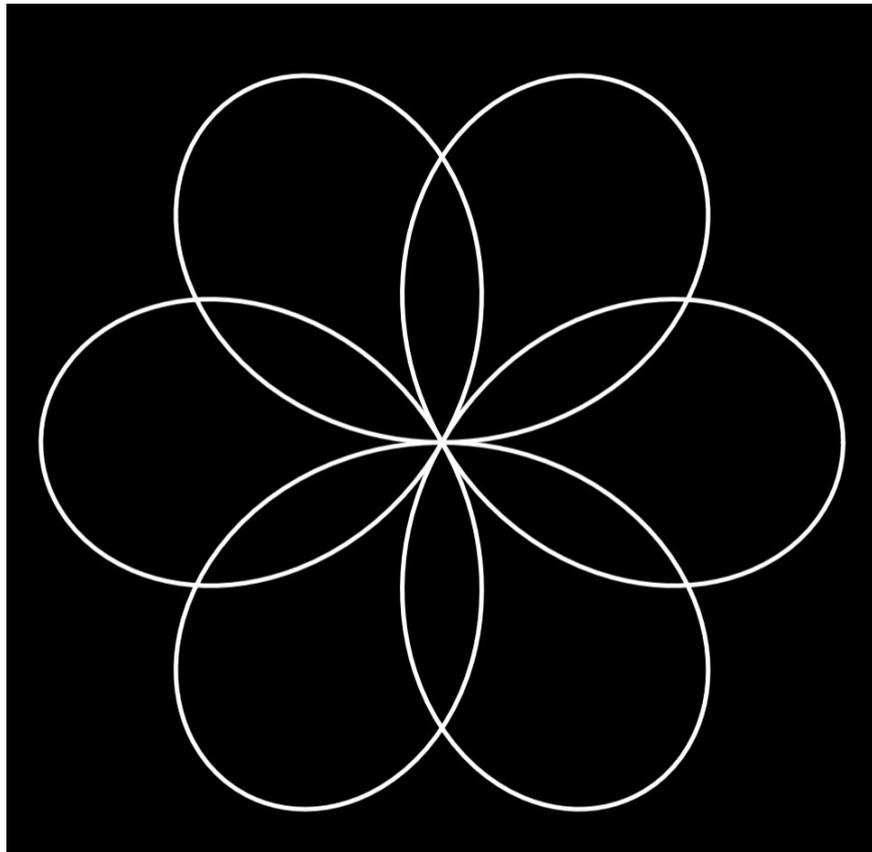
Examples: $N=100$, $P=50$



Example: $N=100$, $P=50$



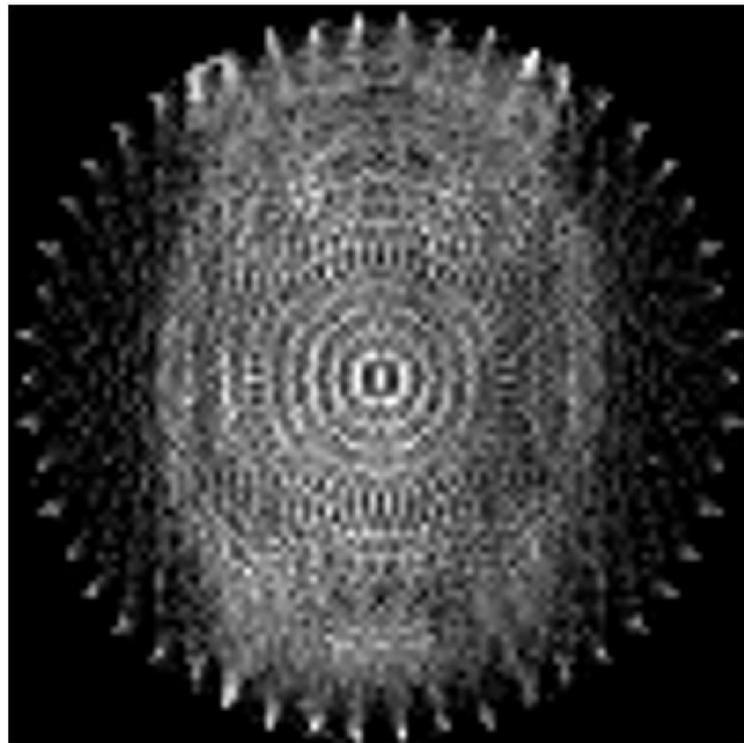
Example: $N=100$, $P=50$



Example: $N=100$, $P=8$



Example: $N=100$, $P=50$



Example: $N=100$, $P=96$

