

Assignment 0: Iterated Function Systems

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代码

IFS类

```
class IFS
{
public:
    IFS(int numTransforms, int numPoints, int numIters);

    void SetTransform(int index, float probability, Matrix transform);

    void PerformIFS(char* outputFile, int imageSize);

private:
    int numTransforms;
    Matrix *transforms;
    float *probabilities;
    int numPoints;
    int numIters;
};
```

PerformIFS函数

产生随机点并循环按概率施加变换

```
void PerformIFS(char* outputFile, int imageSize)
{
    srand((unsigned int)(time(NULL)));
    Image outputImage(imageSize, imageSize);
    outputImage.SetAllPixels(Vec3f(1, 1, 1));

    for (int i = 0; i < numPoints; i++)
    {
        vec2f point((float)rand() / (float)RAND_MAX, (float)rand() /
(float)RAND_MAX);
        for (int k = 0; k < numIters; k++)
        {
            Matrix transform;
            float temp = (float)rand() / (float)RAND_MAX;
```

```

        float total=0;
        for (int j = 0; j < numTransforms; j++)
        {
            total += probabilities[j];
            if (total >= temp)
            {
                transform = transforms[j];
                break;
            }
        }

        transform.Transform(point);

    }

    point.Set(floorf(point[0] * imageSize), floorf(point[1] *
imageSize));

    outputImage.SetPixel(point[0], point[1], Vec3f(0, 0, 0));
}

if (outputFile != NULL)
    outputImage.SaveTGA(outputFile);
}

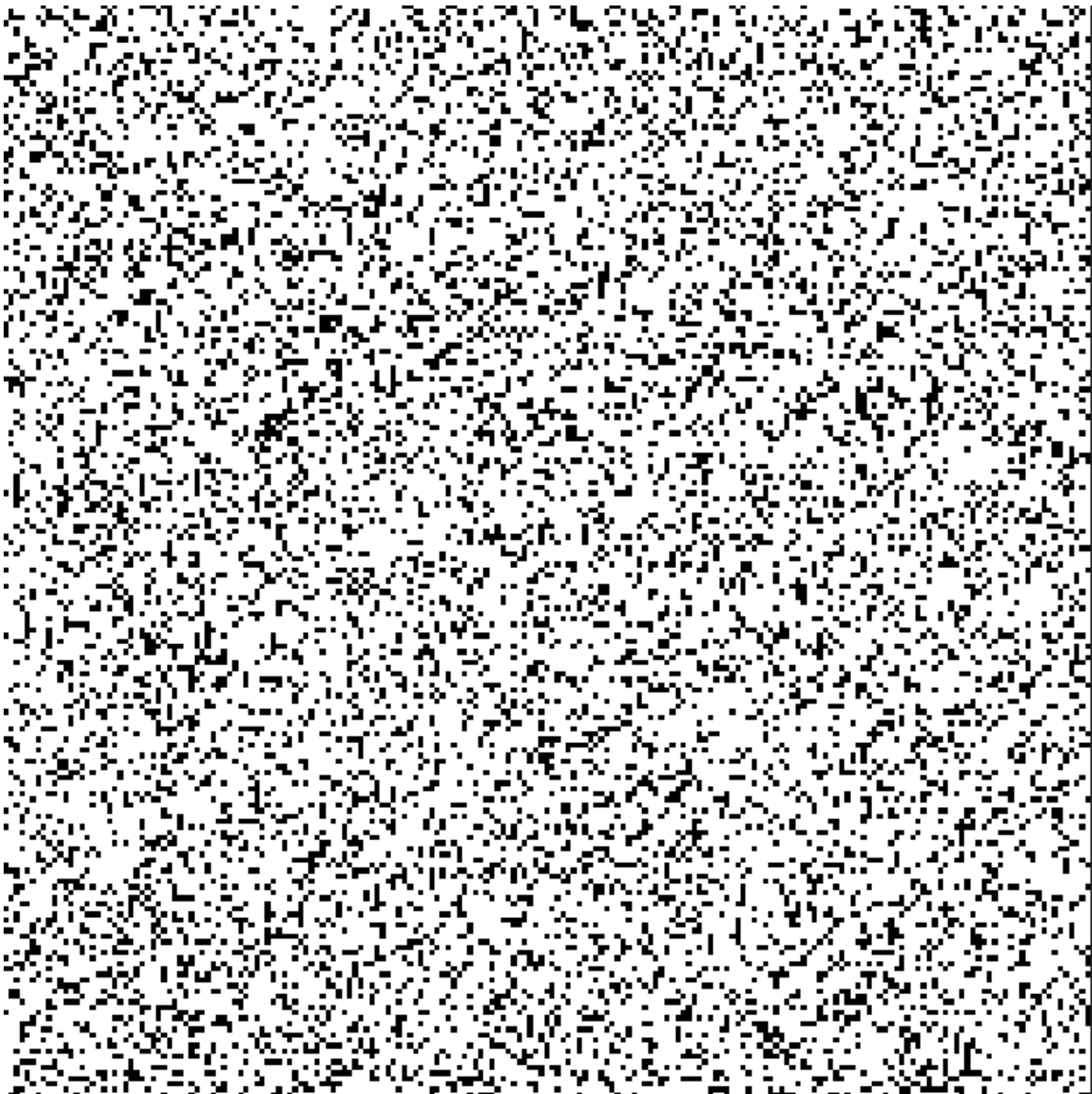
```

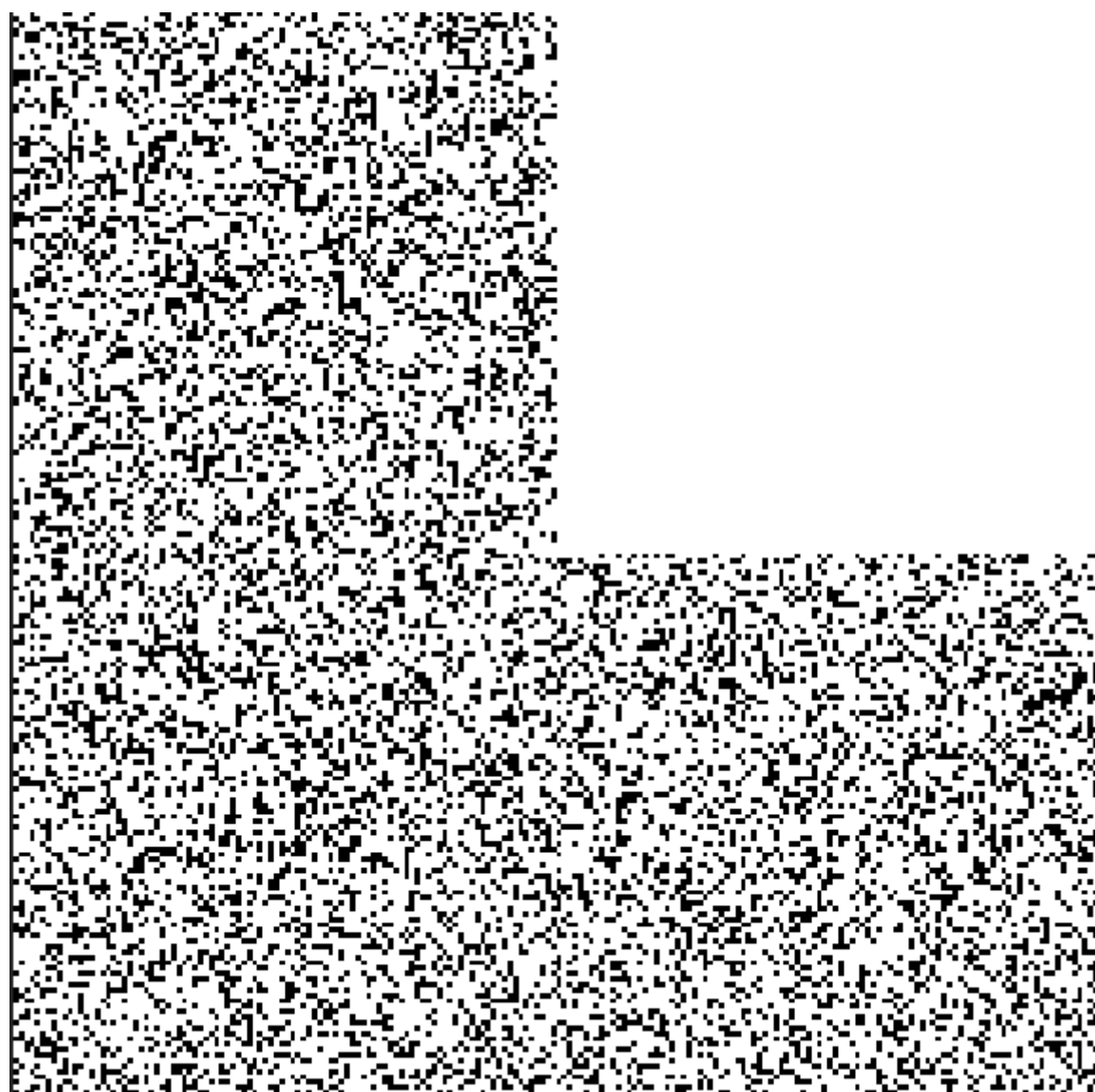
实验结果

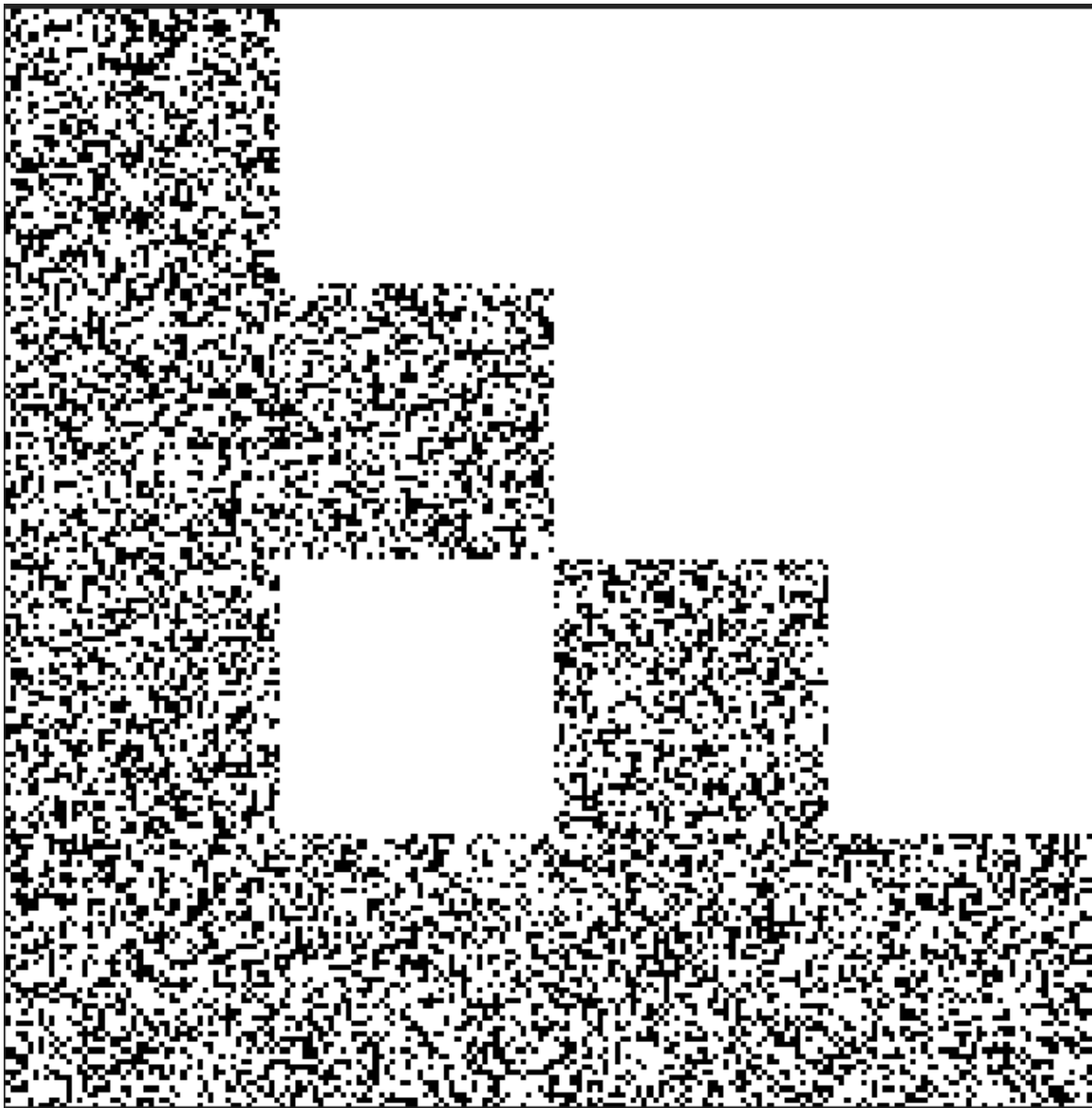
```

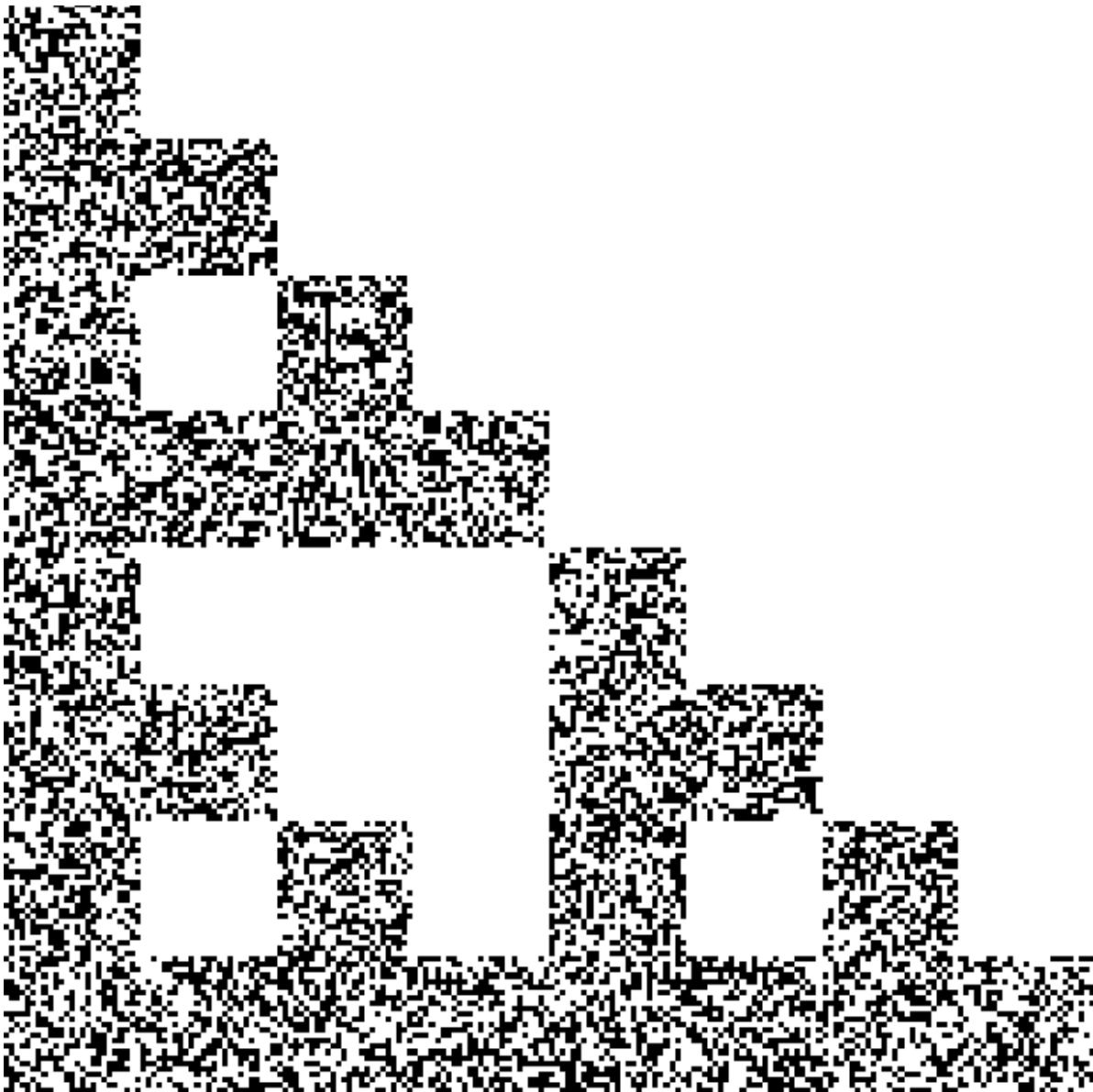
ifs -input sierpinski_triangle.txt -points 10000 -iters 0 -size 200 -output
sierpinski_triangle_0.tga
ifs -input sierpinski_triangle.txt -points 10000 -iters 1 -size 200 -output
sierpinski_triangle_1.tga
ifs -input sierpinski_triangle.txt -points 10000 -iters 2 -size 200 -output
sierpinski_triangle_2.tga
ifs -input sierpinski_triangle.txt -points 10000 -iters 3 -size 200 -output
sierpinski_triangle_3.tga
ifs -input sierpinski_triangle.txt -points 10000 -iters 4 -size 200 -output
sierpinski_triangle_4.tga
ifs -input sierpinski_triangle.txt -points 10000 -iters 30 -size 200 -output
sierpinski_triangle.tga

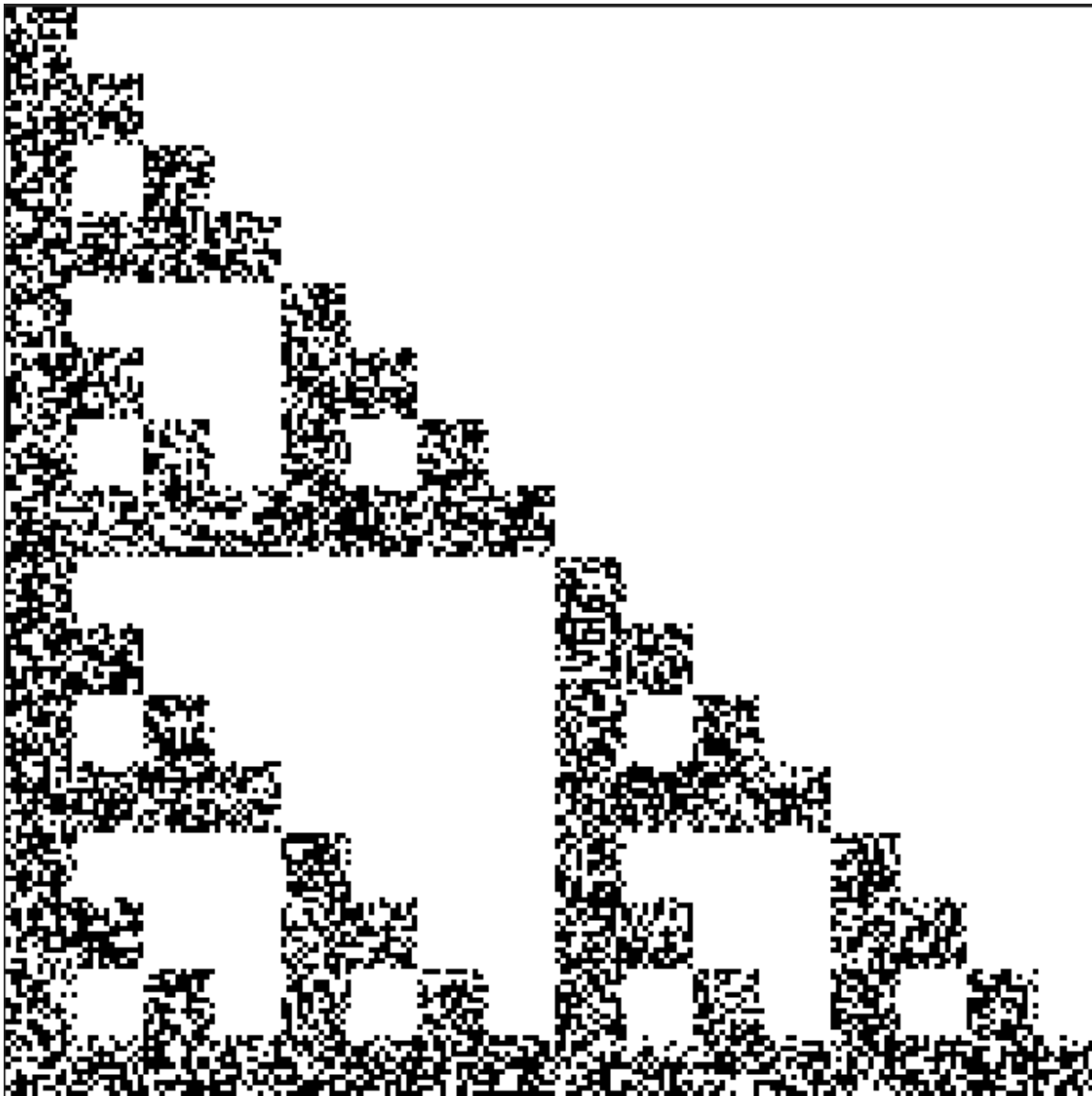
```

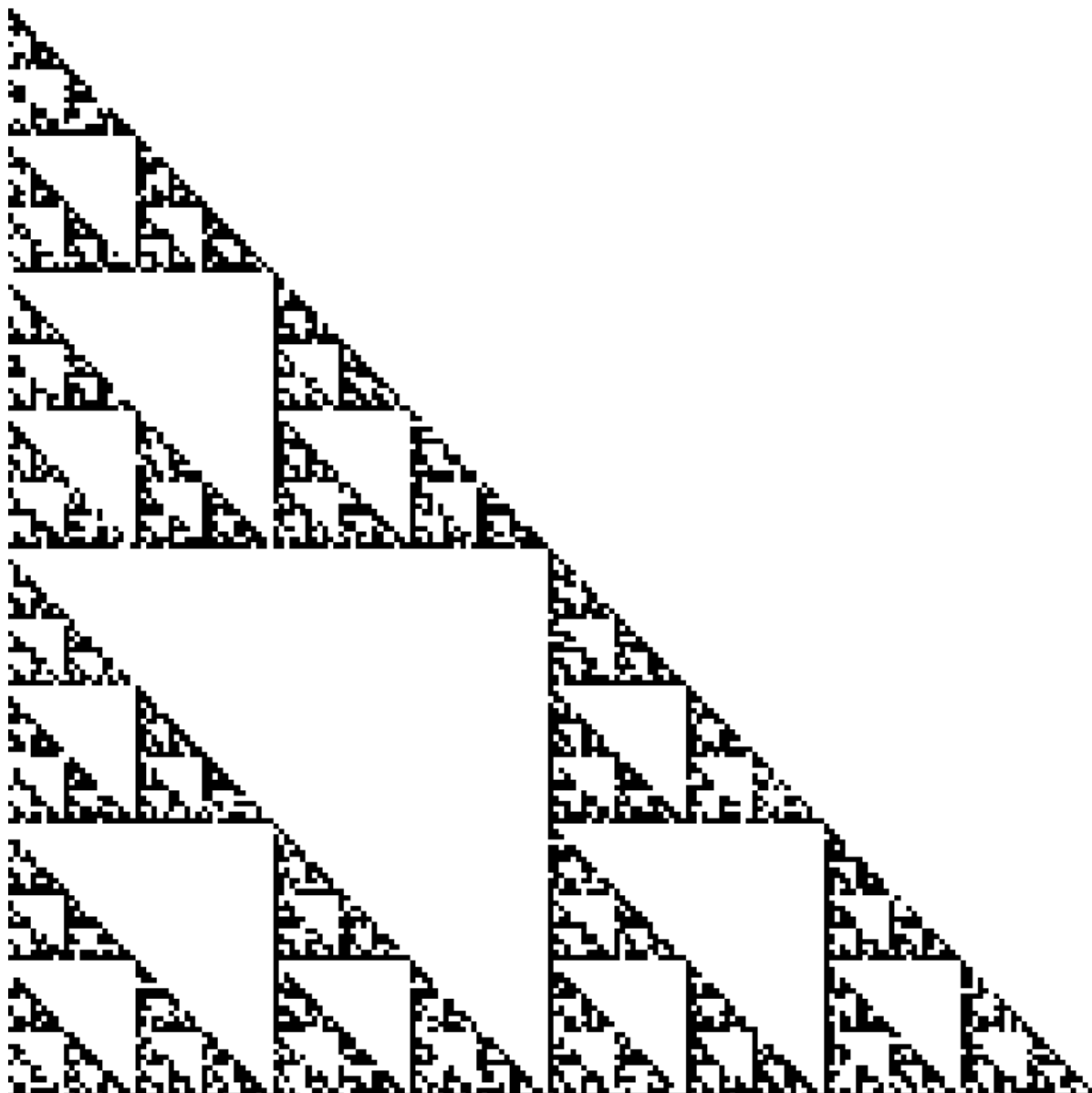












```
ifs -input fern.txt -points 50000 -iters 30 -size 400 -output fern.tga
```