2) Binary decomposition of level sets

Figures 1 and 2 below represent the same dynamical process z -> z^2 and the same dynamical area. Here the target set (the set outside a radius 10) is divided into two regions. The lower region is colored black and the upper region is colored white.

Now each level set, instead of being colored according to the number of iterations required to take the orbit of ”z” to the target set, is colored according if the orbit of ”z” reaches the target set on the lower or upper half of the target set. Those ”z” reaching the lower black half of the target set are colored black, and those ”z” reaching the upper white half of the target set are colored white.

The borders between the black and white regions that are radiating from the Julia set like field lines have very special angles. If we denote the angles as fractions of a whole turn these special angles can be denoted in the form $k/2^n \ mod1$, k and n integers; for example: 3/4, 1/8, 5/16 of a whole turn. ”mod1” means the quote can never exceed 1.

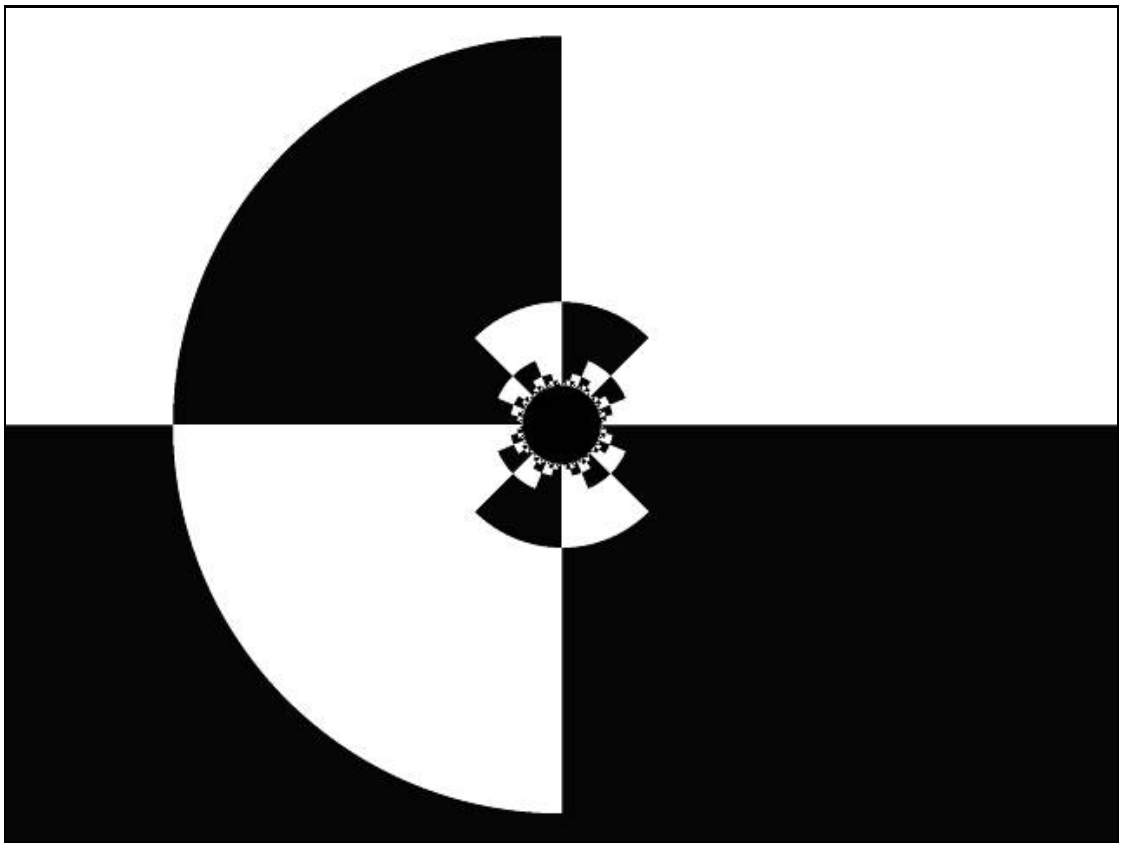

Fig 1. C = 0 Distant.

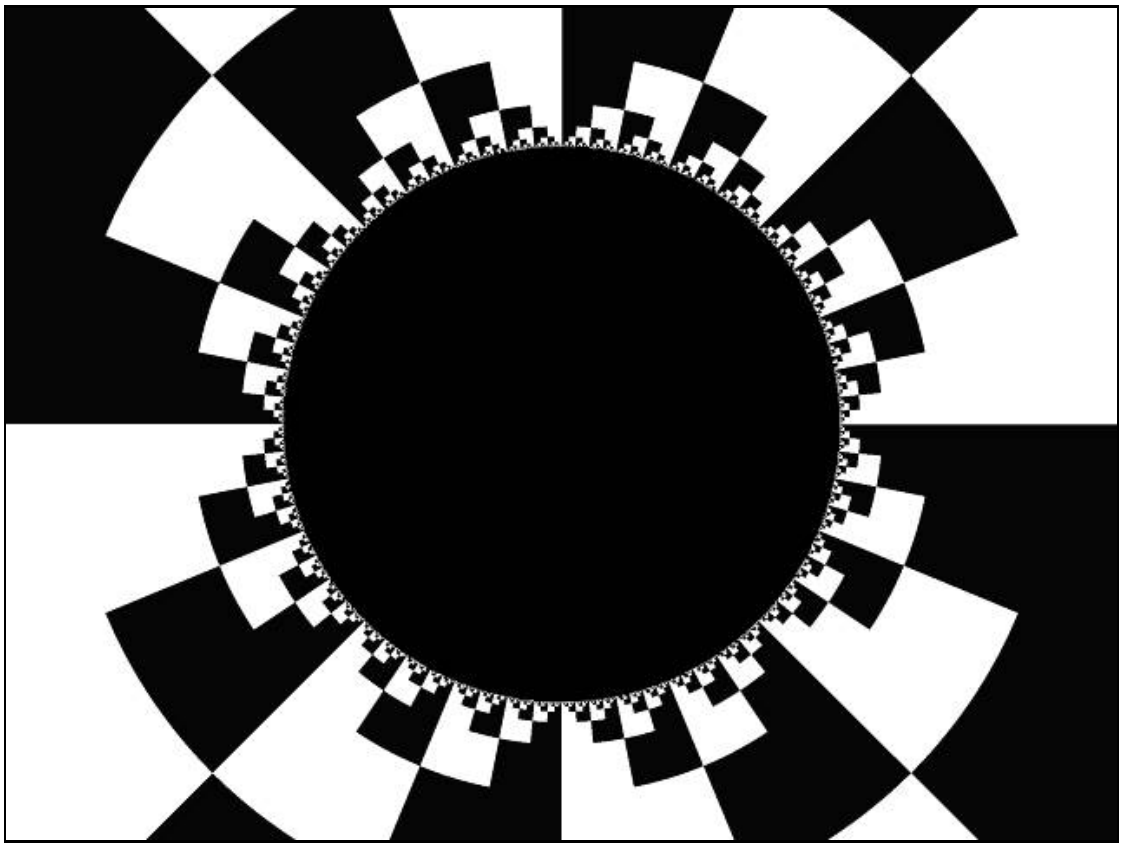

Fig 2. C = 0 normal magnification.

More about Binary Decomposition can be read in ”The Beauty of Fractals” and ”Science of Fractal Images” by Peitgen and his co-writers. The books were published by Springer Verlag.

In next paper I will talk about how binary decomposition relates to ”acupuncture points” and ”secondary decorations”. Then we will see fractals for the first time in this series :-)

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Regards

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