

## TP 12: Distributed rendering of the buddhabrot fractal

---

The objective of this TP is to write a C code rendering the buddhabrot fractal (<https://en.wikipedia.org/wiki/Buddhabrot>) in parallel using multiple computers. The buddhabrot fractal is a variant rendering method based on the mandelbrot fractal.

It is computed by randomly selecting points  $c$  in the complex plane, iterating through  $f : z \mapsto z^2 + c$  from  $z = 0$ , and increasing the weight of all point it passes through if the sequence diverges. The criterion for convergence is if reaches a points of modulus greater than 2 before a fixed number of iterations (since it is known that all number of modulus greater than cause the sequence to diverge). At the end, a grayscale image can be generated by rescaling the resulting value to 0-255. A colored image can be generated by rendering it three times with different maximum iteration, and overlapping the resulting grayscale pictures on different color channels.

A program that handle the complex number manipulation and the rendering to a bmp image is provided. You are expected to first write the logic to render locally the fractal, and then to distribute it over multiple computers.