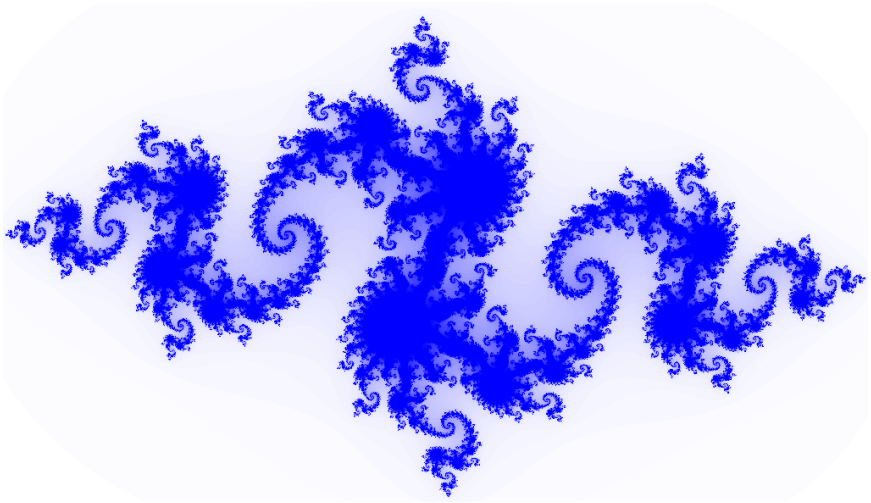
GPU Programming
TP1 – Julia sets



Warm up

Discover the provided base code. Change some features (colors, controls, etc.) to get familiar with it.

Note that the GPU mode doesn't do anything but only performs at 60 frames/s. Why is this so, and how do we get beyond this frame rate?

Julia sets are beautiful escape-time fractals. Browse the internet and make yourself knowledgeable about the Julia set algorithm.

This is the pseudo-code for the Julia color of a single complex point (x,y), depending on the constant seed (sx, sy) and the computing precision p:

```
function juliaColor (x, y, sx, sy: float, p: int): color in 0..1 gray scale
{
	a = complex (x,y)
	seed = complex (sx, sy)
	for (i=0; i<p; i++) {
		a = a * a + seed;
		if squaredMagnitude(a) > 4 then return 1-i/(float)p
	}
	return 0
}
```

Exercices (1 point per question)

1) Write a CPU version of the Julia set fractals. The user can change the seed by moving the mouse, and increment/decrement the precision by hitting special keys.
2) Write an equivalent GPU version of the Julia set fractals. Use 2D thread and 2D block indexing. The user can toggle between the CPU mode and the GPU mode. How much speedup do we get?