Through a Glass, Darkly

James Noble

School of Engineering and Computer Science
Victoria University of Wellington
Wellington, New Zealand
kjx@ecs.vuw.ac.nz

Abstract

For now we see through a glass, darkly;
but then face to face:
now I know in part;
but then shall I know even as also I am known.

1 Corr. 13:12 (KJV)

Oh, Kitty! how nice it would be if we could only
get through into Looking-glass House!
I'm sure it's got, oh! such beautiful things in it!

Through the Looking-Glass,
and What Alice Found There
Chapter I. Lewis Carroll,
MACMILLAN AND CO. London. 1872.

Reflection gives us a mirror into our programs. Using this mirror, we can see our programs' structures, perhaps their execution, and maybe even reach through the mirror to change what our programs are and what they do.

Reflections, though, have always been mysterious. What happens when a mirror is reflected in a mirror? Can we escape from an infinite regression? What if we don't just want to see a static image, but, like Alice, want to see the constructions of our programs "walking about, two and two!" Is an object reflected in a mirror the same object as before, or the same as its reflection? What are the differences between actions in our programs, and actions in their reflections? Can a reflection ever truly "reflect" everything, or does every mirror long to be part of a carnival, never giving up a true image? Once we start reflecting on our programs, how do we know when to stop?

In this talk, I'll consider what lives on each side of the mirror and what happens when we cross that boundary. I'll describe how mirrors let us peer into the middle of our programs, what happens when we reflect on concepts rather than objects, and what happens when we hold a mirror up to itself. I'll revive some historical work (and arguments) about reflection and mirrors in Smalltalk and Self. I'll discuss the way reflection works in the Grace language, and I'll present some prospects for extending it in the future.

Keywords reflection, metaprogramming, alice through the looking-glass, program visualisation, apostles

Alice through the looking glass.
Illustration by John Tenniel. 1872.

"It seems very pretty," she said when she had finished it, "but it's rather hard to understand!"

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