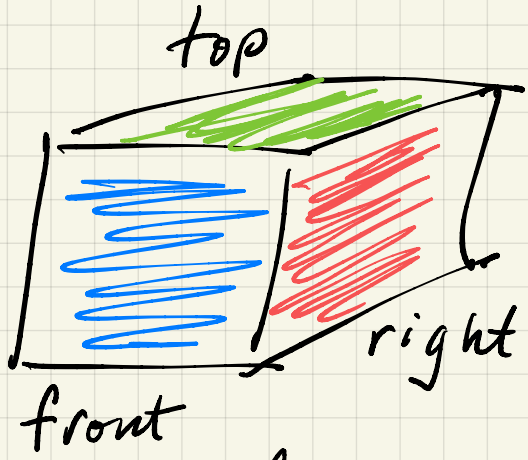
Instant Insanity – Rough Sketches

Arthur Ryman

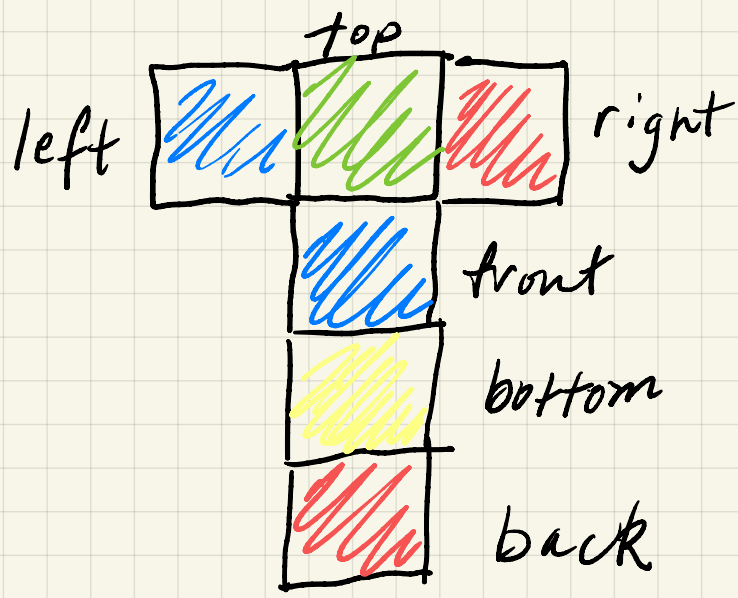
2024-12-07

Here is a cube:



It has 6 faces but only 3 are visible from any viewpoint.

We can see all the faces if we unfold it:



Each face can have one of four colours: Red, Green, Blue,

or White/Yellow.

If you buy the puzzle, some use White and some use Yellow for the fourth colour. I'll use Yellow here so it stands out against the white background

The opening scene of the animation should show the cubes and rotate them so all the faces are visible.

The key idea of the <u>Graph Theory</u> solution is to represent each cube as a graph.

A <u>graph</u> is a mathematical structure that consists of two sets, namely a set of <u>points</u> and a set of <u>lines</u> connecting them.

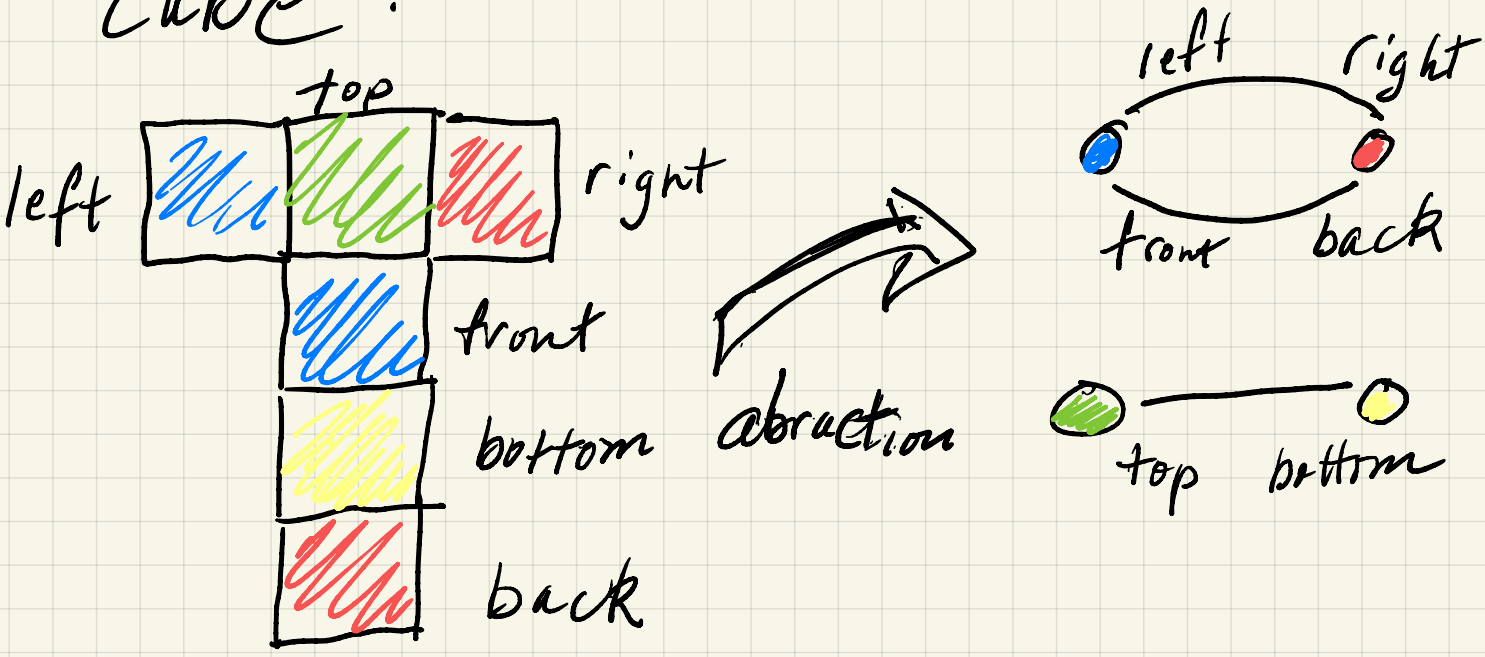
"Points and lines" are sometimes called "vertices and edges" or "nodes and arcs", depending on the context and the additional conditions imposed on them.

The tactic of replacing one mathematical object, e.g. the cube, with another,

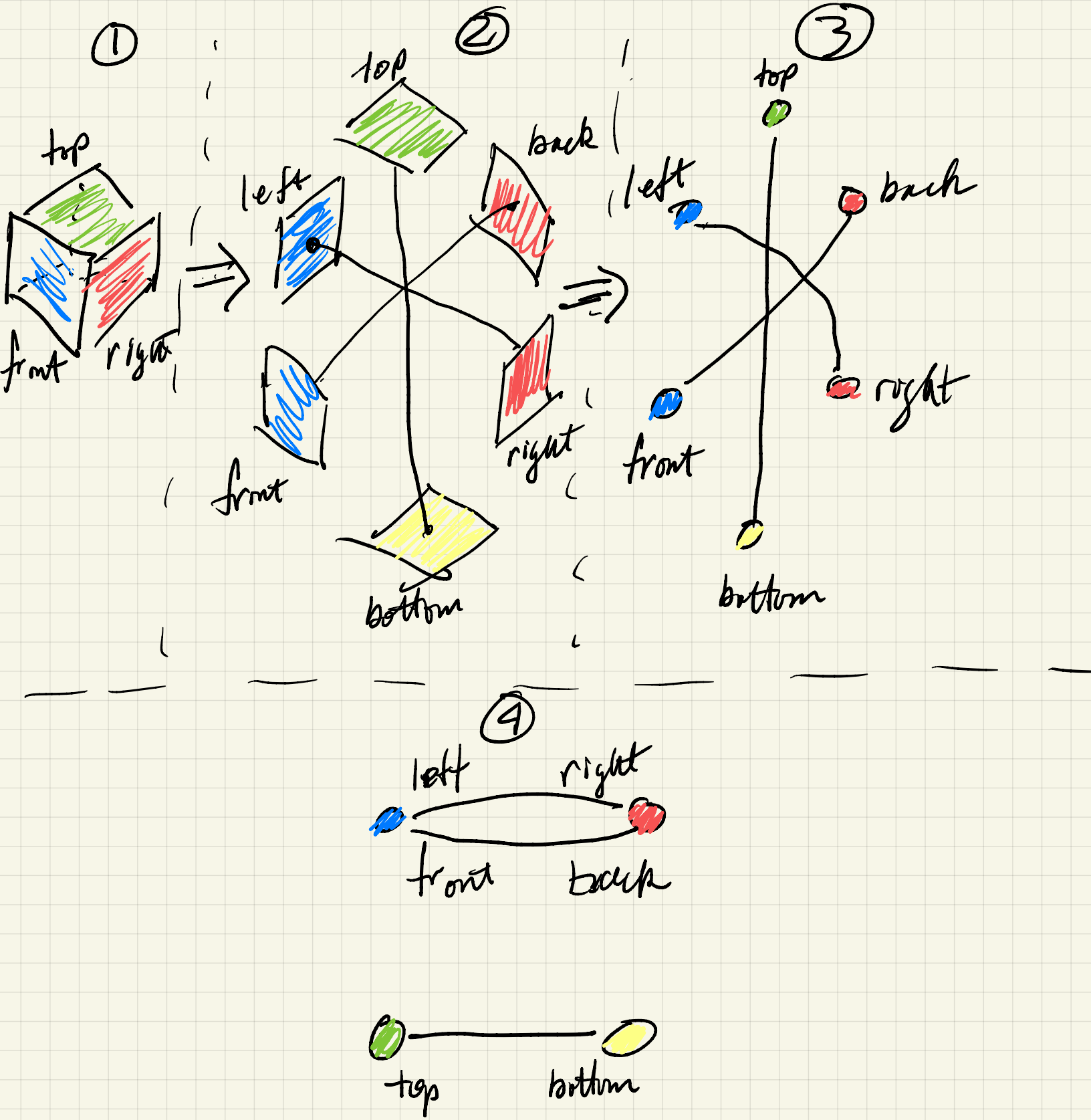
e.g. the graph, is a standard move in the mathematician's playbook. It is a good move if the replacement object is simpler than the original, but not so simple that it loses essential aspects of the original. The process of simplifying a problem by just the right amount is referred to as abstraction. We throw away inessential detail to make the problem more tractable.

The graph abstration consists of creating a point for each distinct colour, and a line for each pair of opposite faces.

Let's do it for the example cube.



The process of converting the cube to a graph could make a nice animation.


1
top
front
right
2
top
left
back
front
right
bottom
3
top
left
back
front
right
bottom
4
left
right
front
back
top
bottom