(4.7.6) a) A point appears, splits into two points that move apart then back together. This could be a circle.

b) A line appears, but then we see only two points that get closer together, merge, and disappear: A triangle that hits the line bottom-first. △↓

c) A square: We see one side of the square, then two points where the vertical sides of the square intersect the line, then the final side. □↓

d) A finite line segment that always intersects the line in one point. |↓

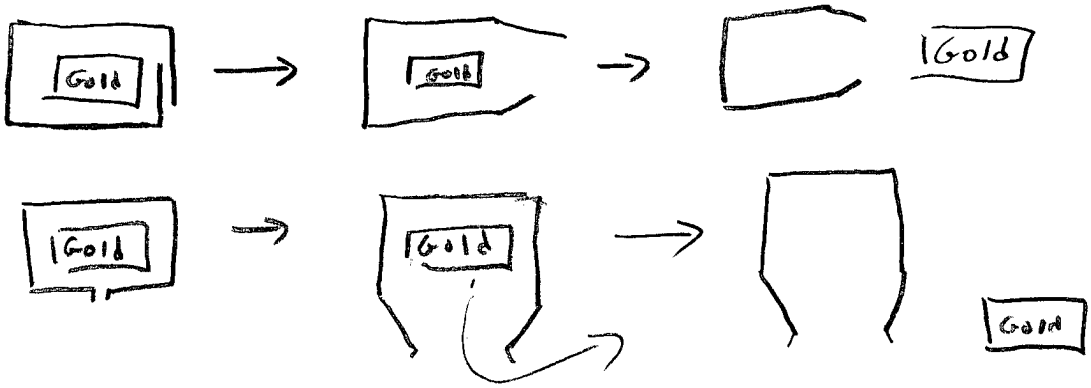
(4.7.8) a) A hypersphere, the 4D analog of a sphere.

b) A hypercube, the 4D analog of a cube

c) A line segment.

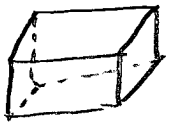
d) The 4D analog of a Triangle or Tetrahedron.

(4.7.9) For the first two pictures, we can simply bend the sides in 2D to liberate the gold. Once the sides are bent, the gold can simply be slid along the plane in 2D to remove it from the box:



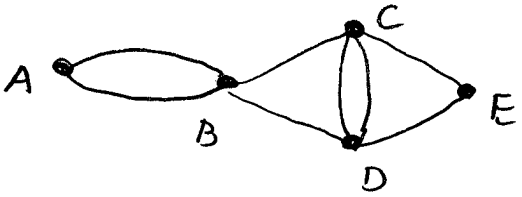
(4.7.10) Just move the gold upwards in 3D, perpendicular to the plane, then slide it over in 3D and replace it into the 2D plane, outside the box. (It disappears from the 2D world while it is being moved.)

Part 2



First of all, it would be finite. There would only be a certain amount of space to move around in. It could be completely mapped, which would not be possible in an infinite universe. If you travel far enough in a straight line, it is possible to get back to where you started. It's important to understand that there are no boundaries in this world, even though it is finite – when you pass through one of the sides of the fish tank, you don't experience it as crossing a boundary – you just keep going!

6.1.1



6.1.10 It has no Euler circuit, since it has vertices of odd degree. In fact, there are 6 vertices of odd degree. To get an Euler circuit by adding edges, we need to add another edge at each of those 6 vertices. This can be done by adding 3 edges. For example, AC, GF, and EH. New edges connect pairs of existing vertices.

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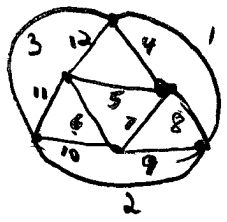
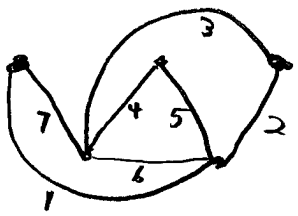
a)

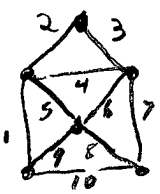


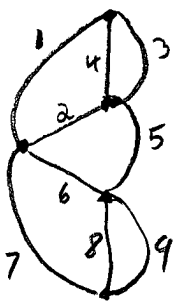
b) has no Euler circuit since it has odd degree vertices (for example, A)

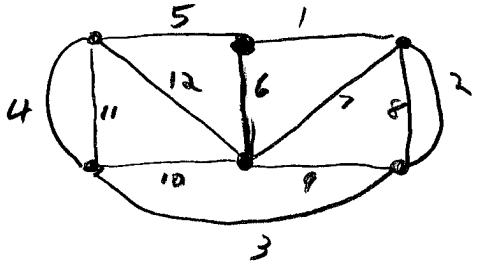
c)



Part 4







(NOTE: All these paths are just examples.)