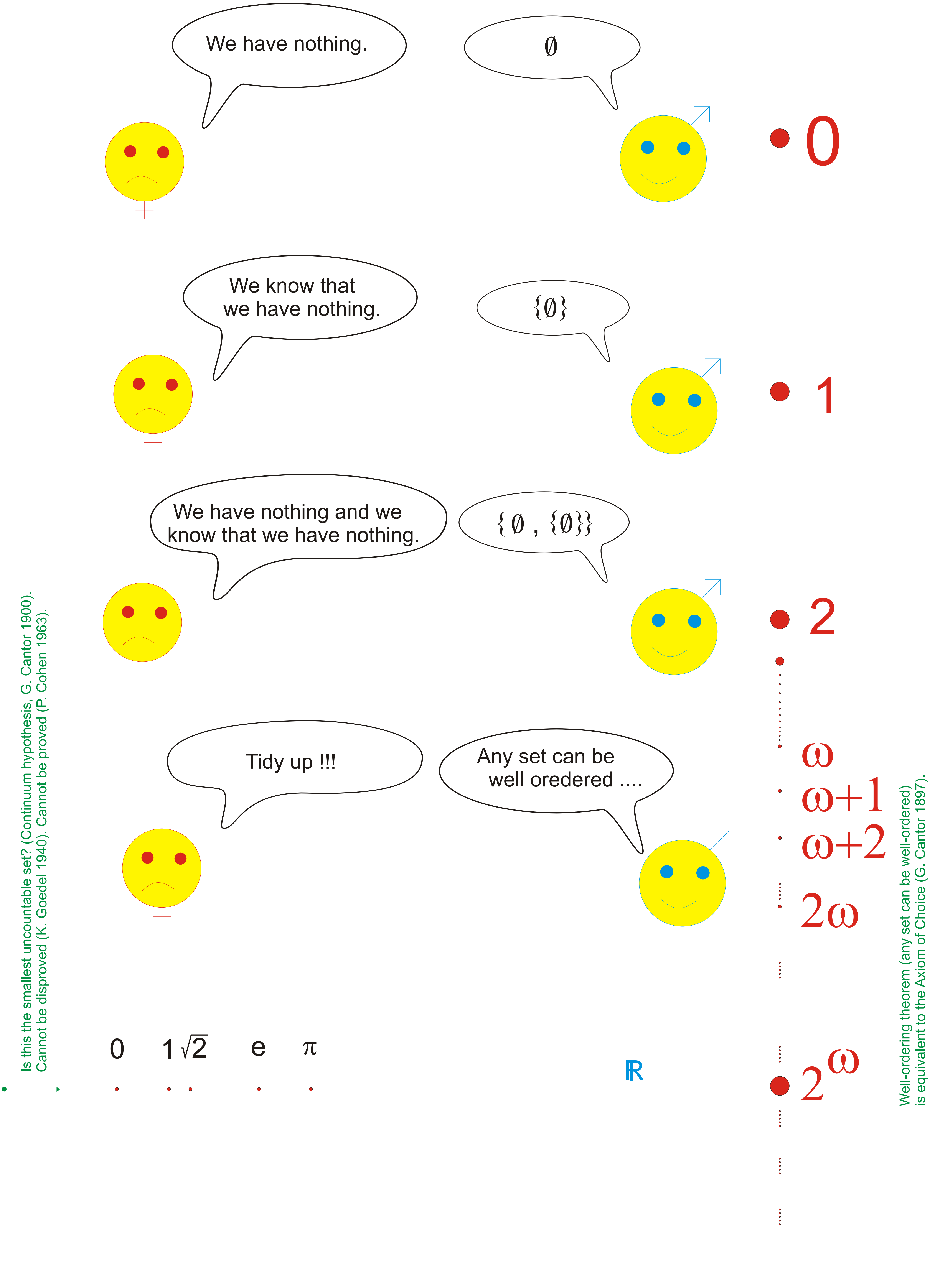
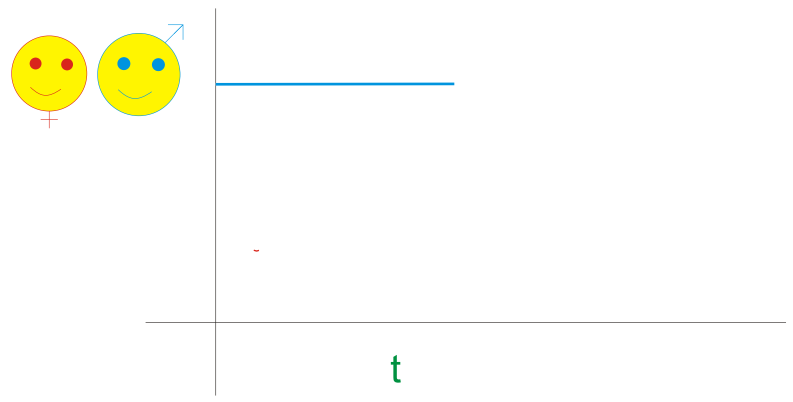
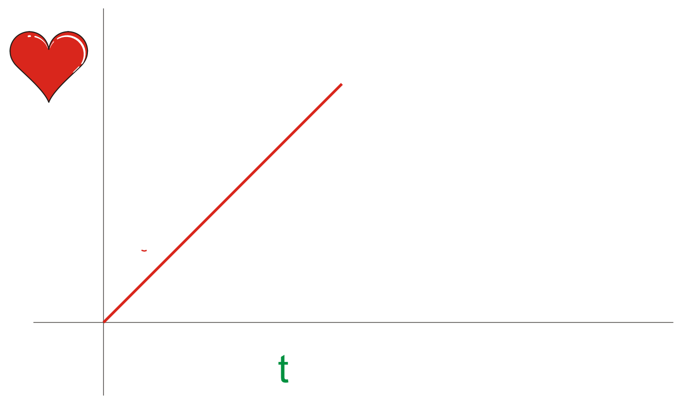
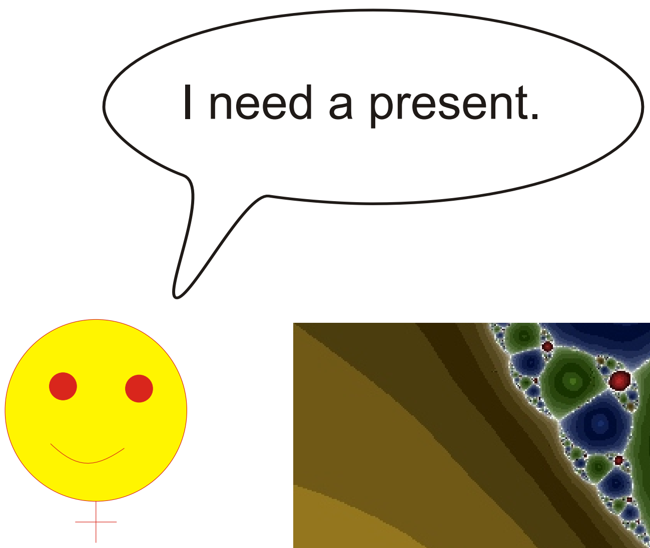

M


We have nothing.
∅
0
We know that we have nothing.
{∅}
1
We have nothing and we know that we have nothing.
{∅ , {∅}}
2
Tidy up !!!
Any set can be well oredered ....
ω
ω+1
ω+2
2ω
2^ω
0 1 √2 e π
ℝ
Is this the smallest uncountable set? (Continuum hypothesis, G. Cantor 1900). Cannot be disproved (K. Goedel 1940). Cannot be proved (P. Cohen 1963).
Well-ordering theorem (any set can be well-ordered) is equivalent to the Axiom of Choice (G. Cantor 1897).



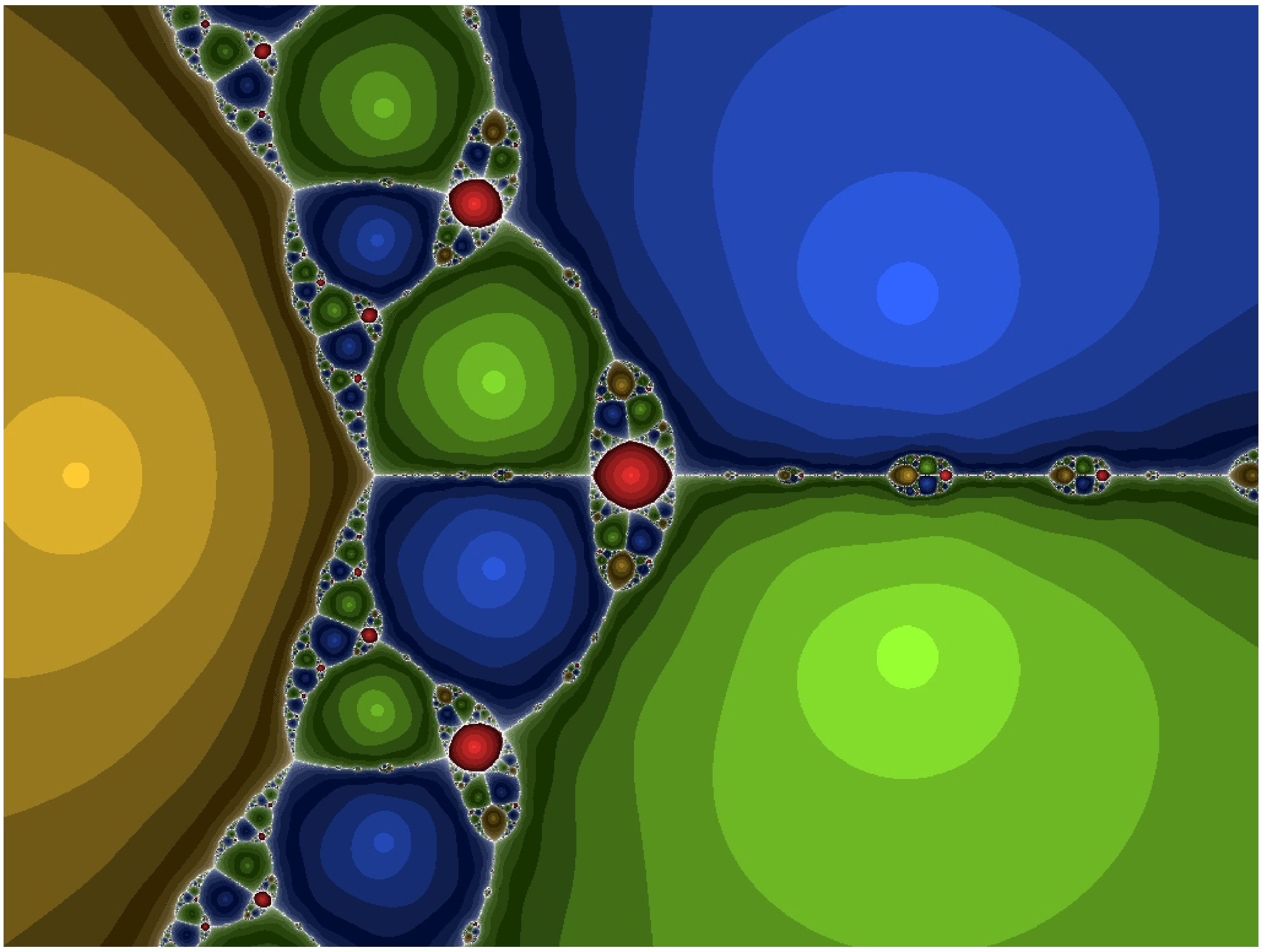


SMILE = (LOVE)’



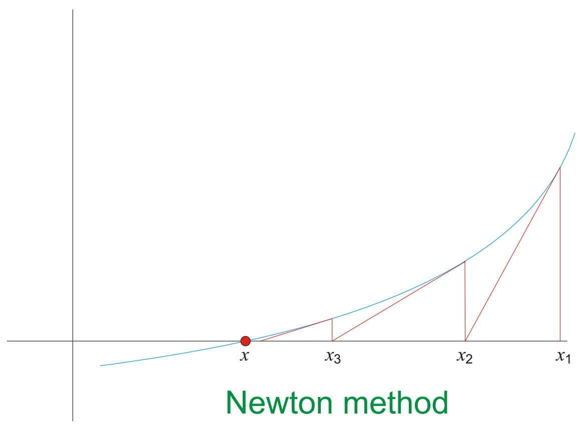
Fundamental theorem of Calculus (I. Newton 1666) states that

$$\int_0^1 \text{SMILE} = \text{LOVE}(1) - \text{LOVE}(0)$$

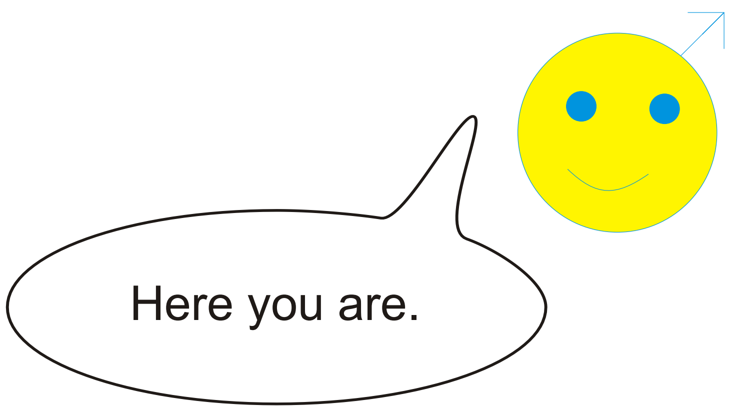


Solution of $f(z)=z^3-2z+2$ in the range [-2,2]x[-1.5, 1.5]i discovered by the Newton method. Orange, blue and green starting points converge to the solutions, red approach both 0 and 1, white points are common boundary (4-corner points).

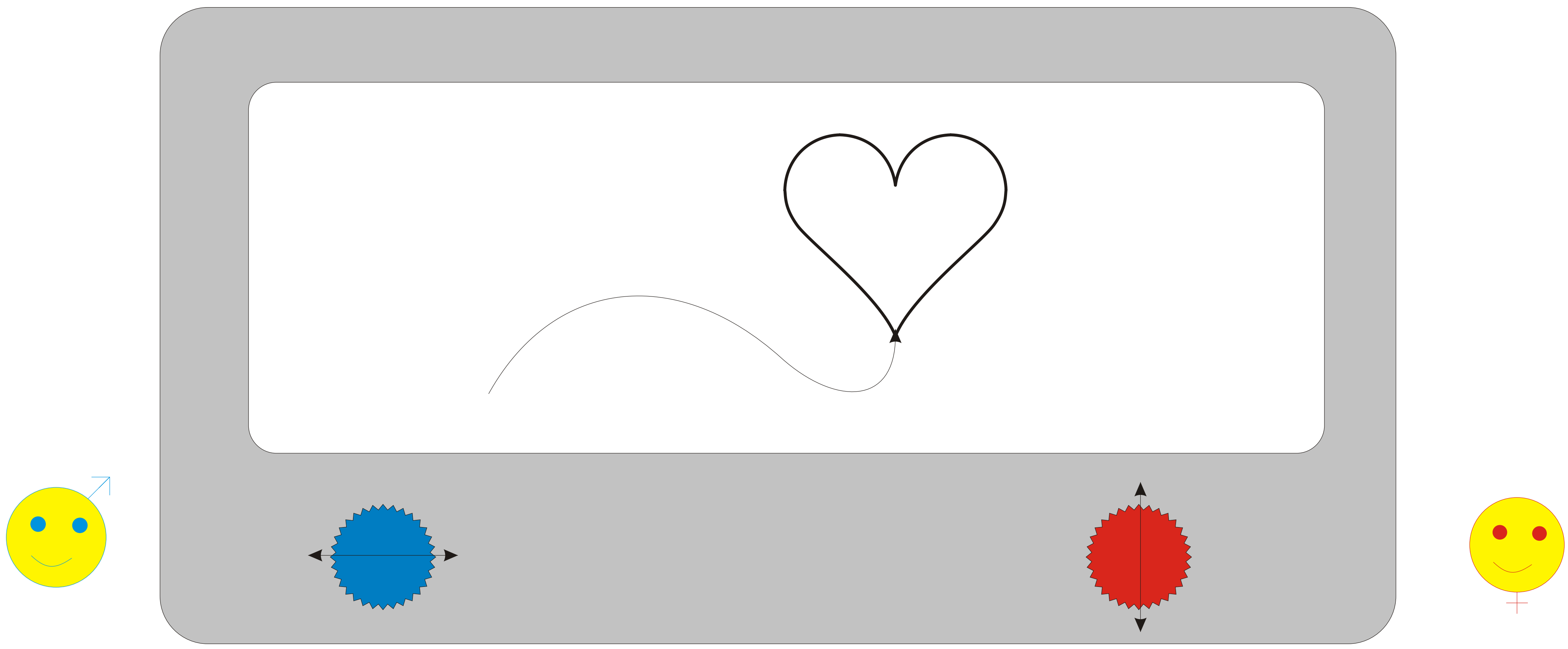
GIFT = (SMILE)’



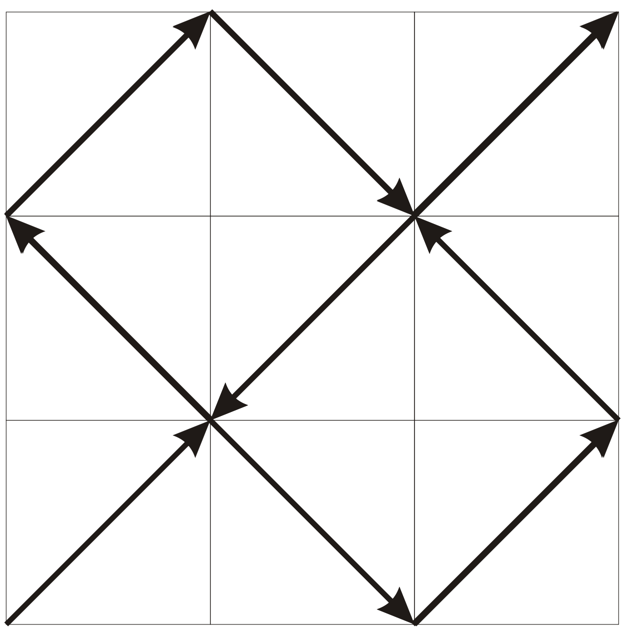
Newton method



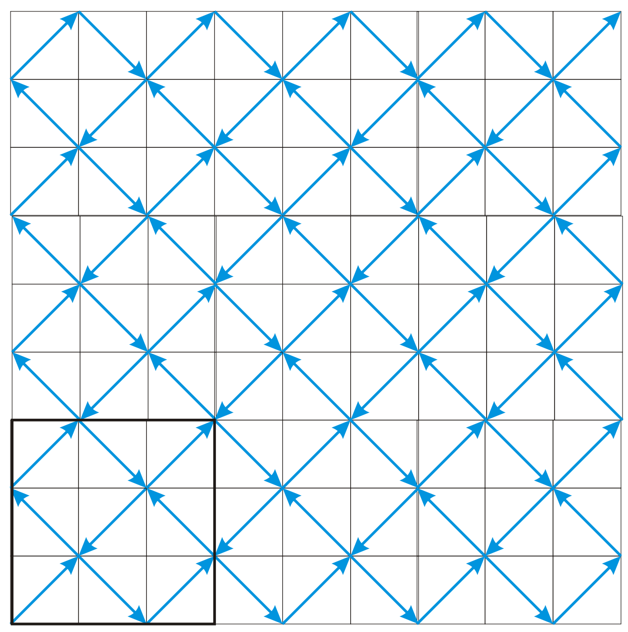
p_0



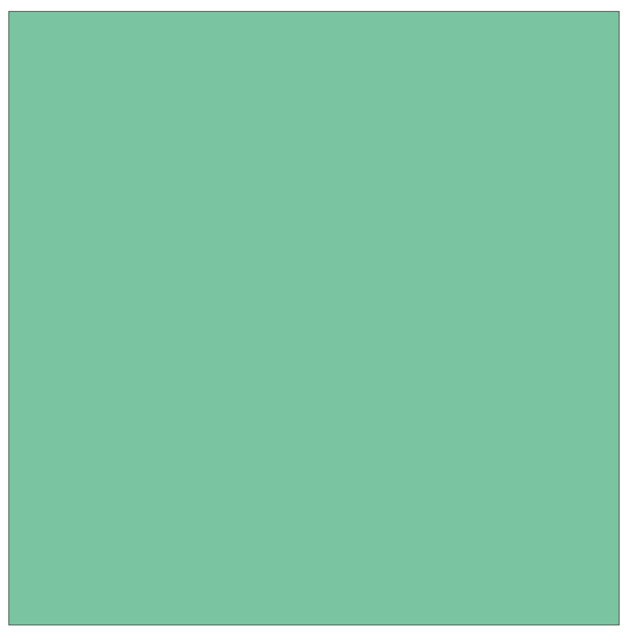
p_1



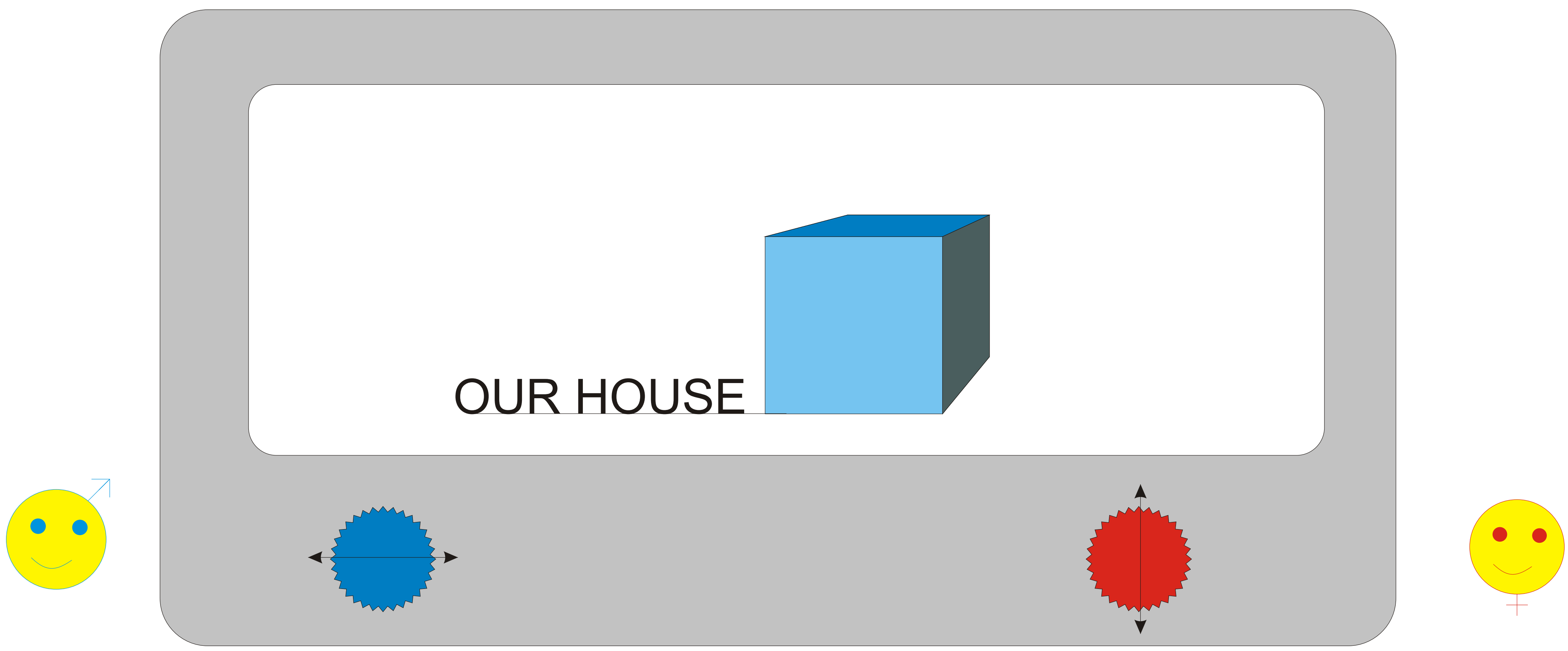
p_2

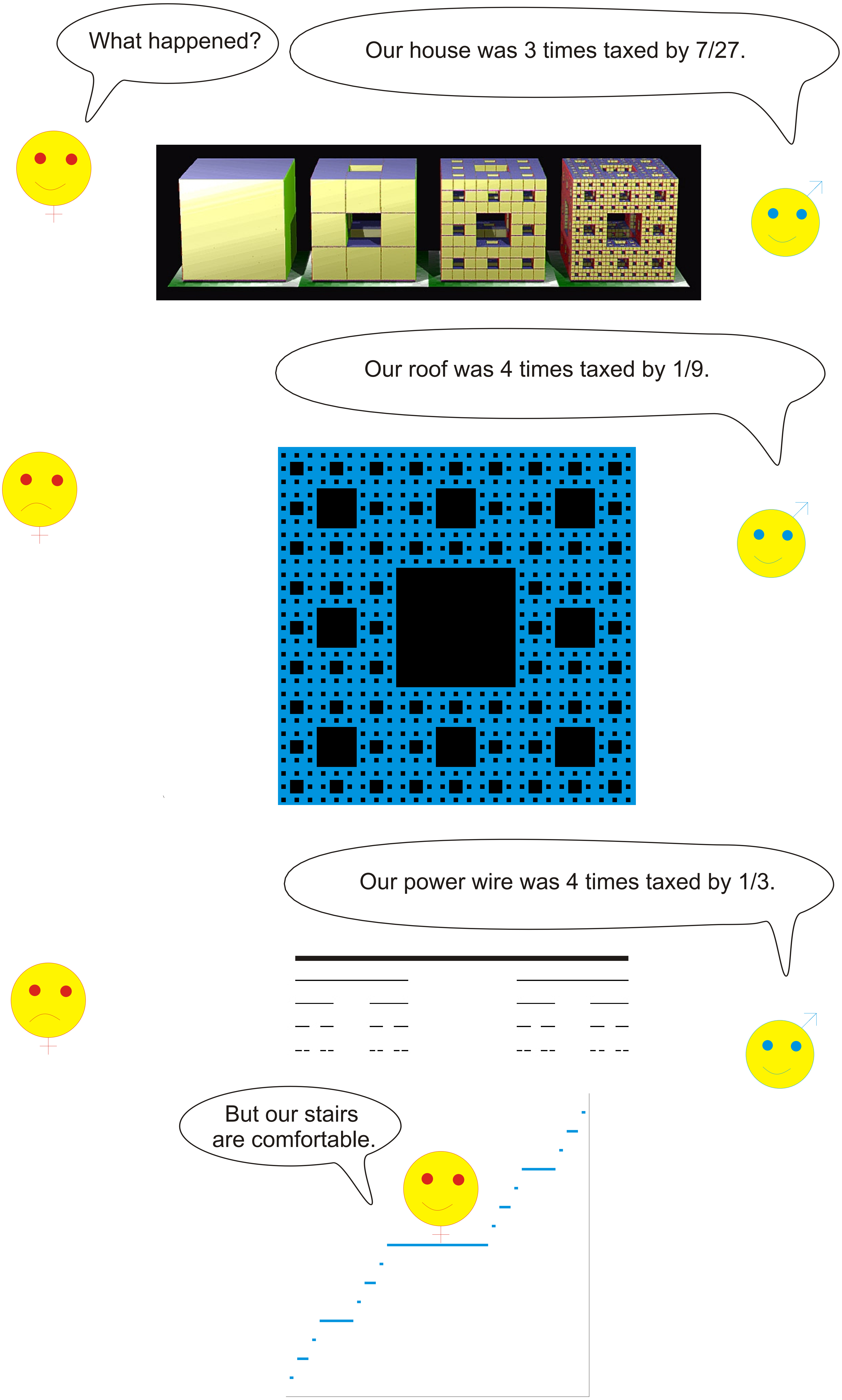


p_ω



$p_{\omega+1}$

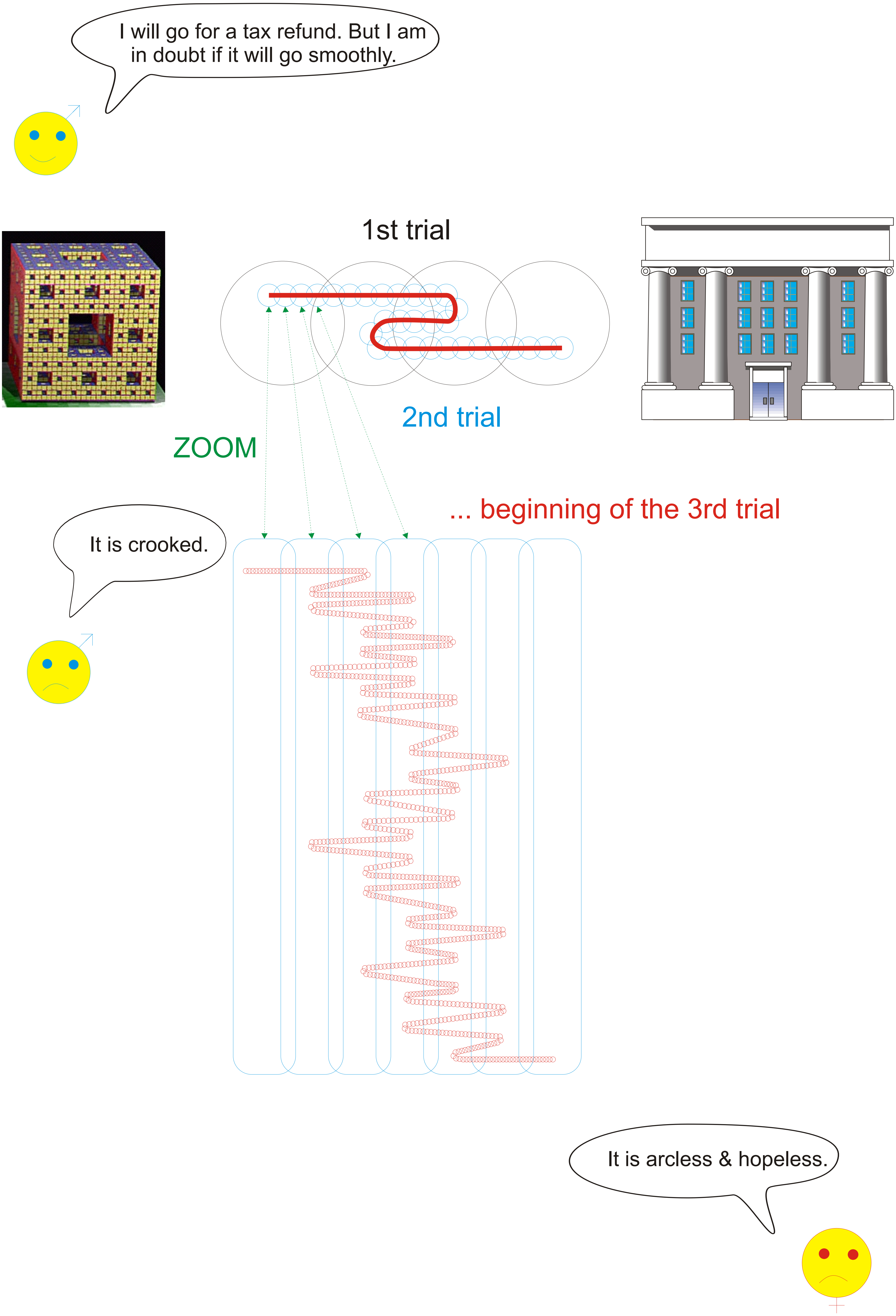




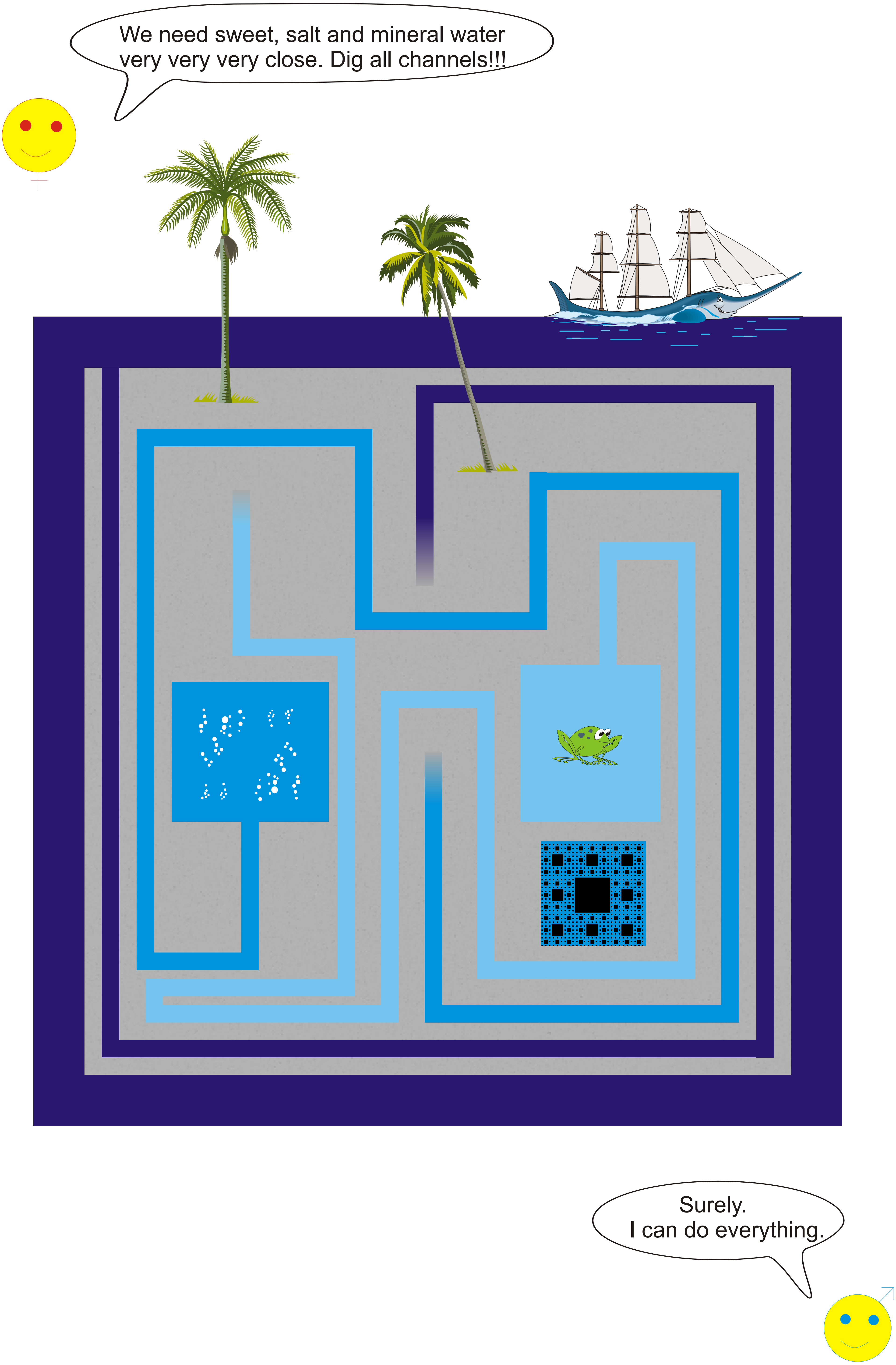
After ω steps we obtain from the house the Menger sponge (containing any curve, K. Menger 1926).

After ω steps we obtain from the roof the Sierpinski carpet (containing all plane curves, W. Sierpinski 1916).

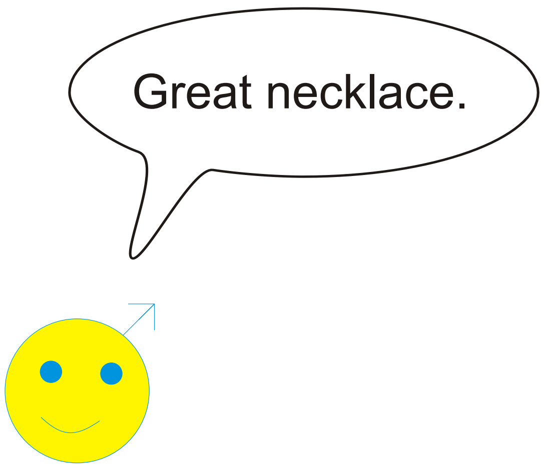
After ω steps we obtain from the wire the Cantor set (typical compact metric space, G. Cantor 1883).

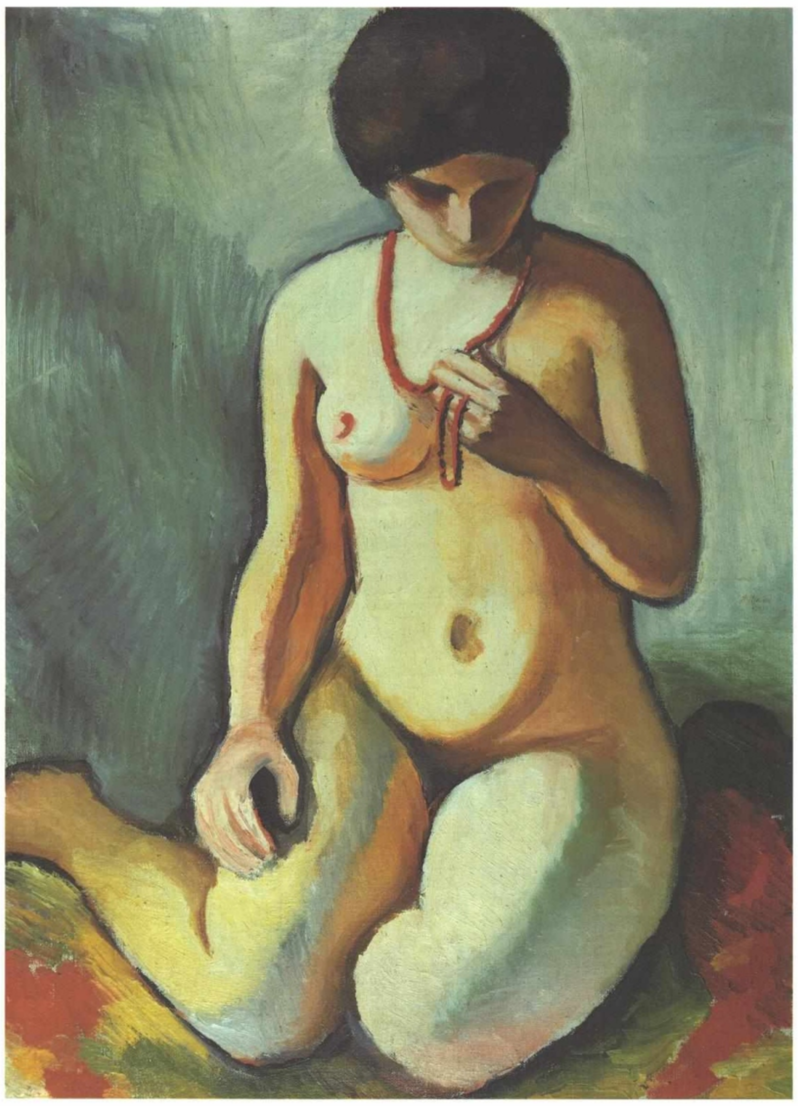


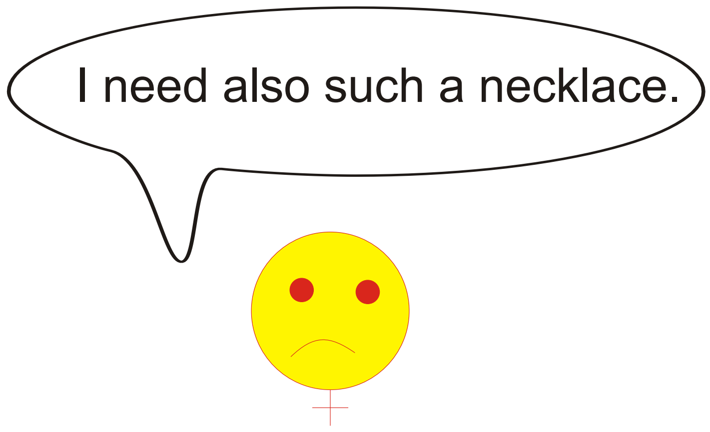
After ω trials we obtain the Pseudo-arc (homeomorphic to each its connected closed subset, typical compact connected metric space, B. Knaster 1922).

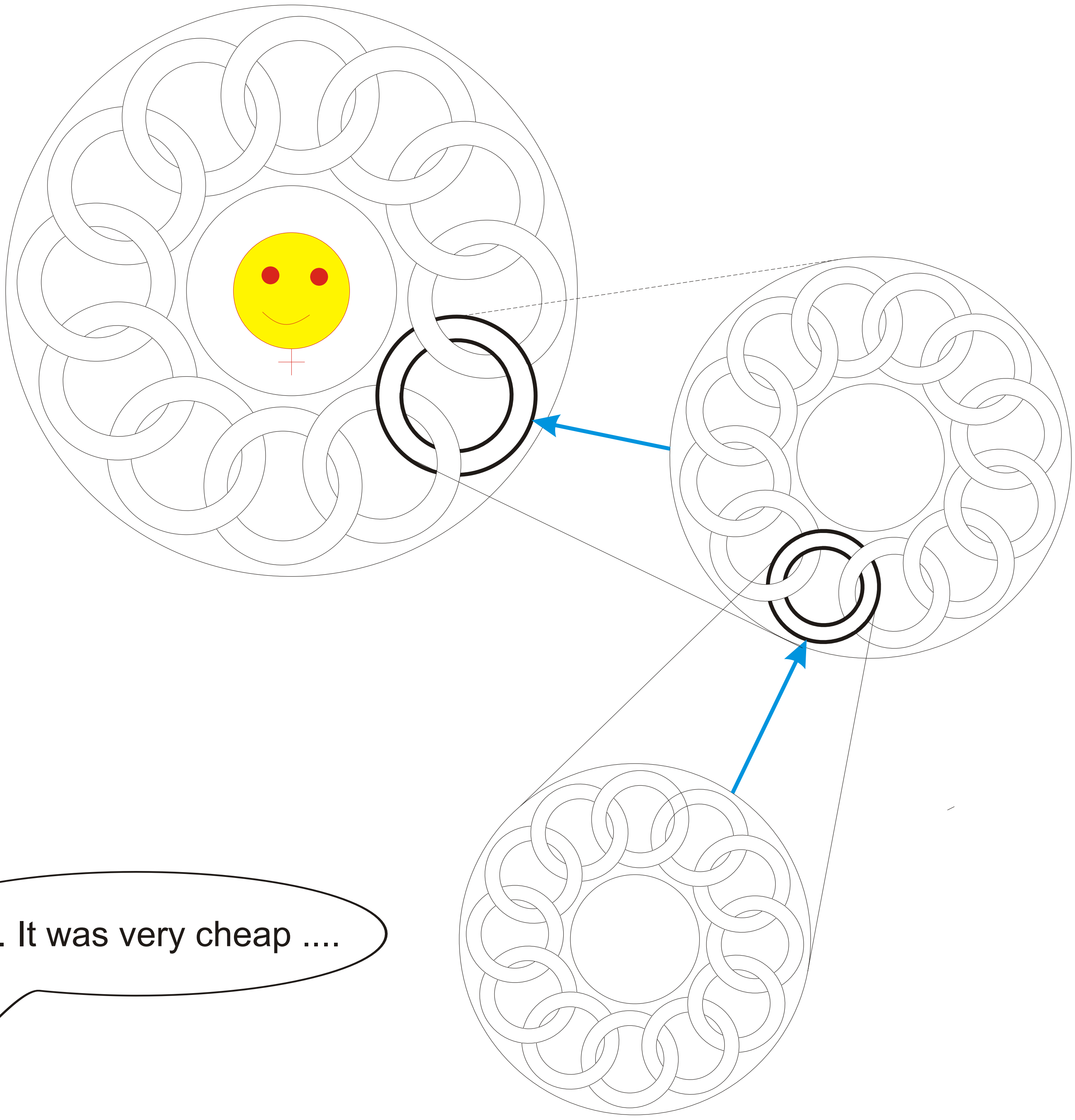


After ω digging we obtain 3 disjoint open connected sets of the plane with the same boundary (lakes of Wada, contaning salt, sweet and mineral water, K. Yoneyama 1917).



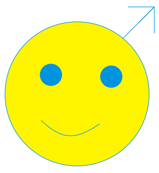


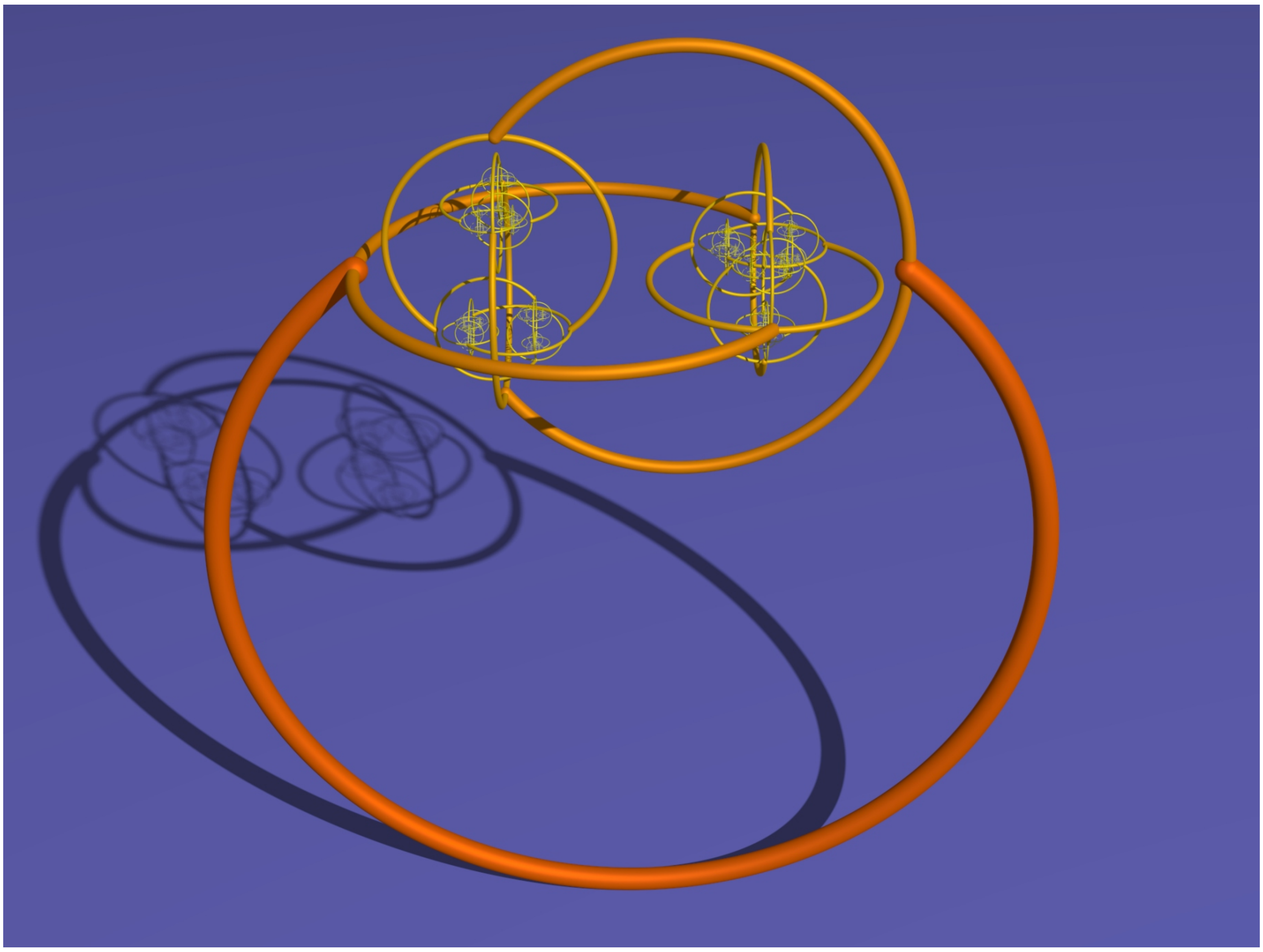




After ω carvings we obtain a necklace homeomorphic to the Cantor set embedded in the space in such a way that its complements contain a circle not schinkable to a point (Antoine's neckalace, L. Antoine 1921).

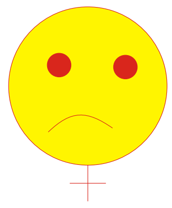
Here is a pendant
for your necklace.

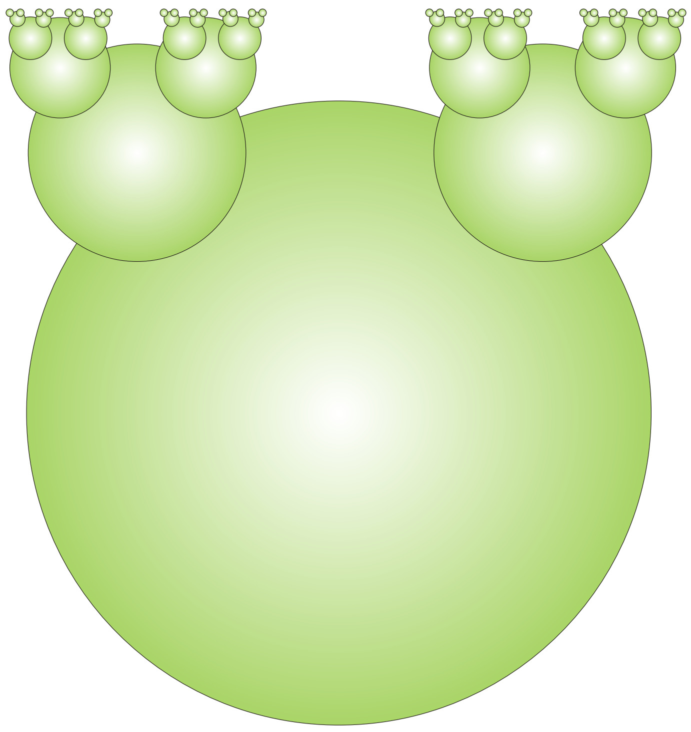


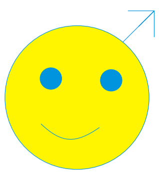


The pendant (Alexander horned sphere) is topologically a cube, but it's complement contains a circle not shrinkable to a point
(Alexander horned sphere, J. W. Alexander 1924).

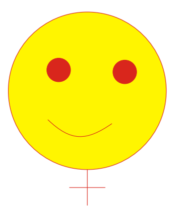
It is topologically a cube.
It will fall down ...

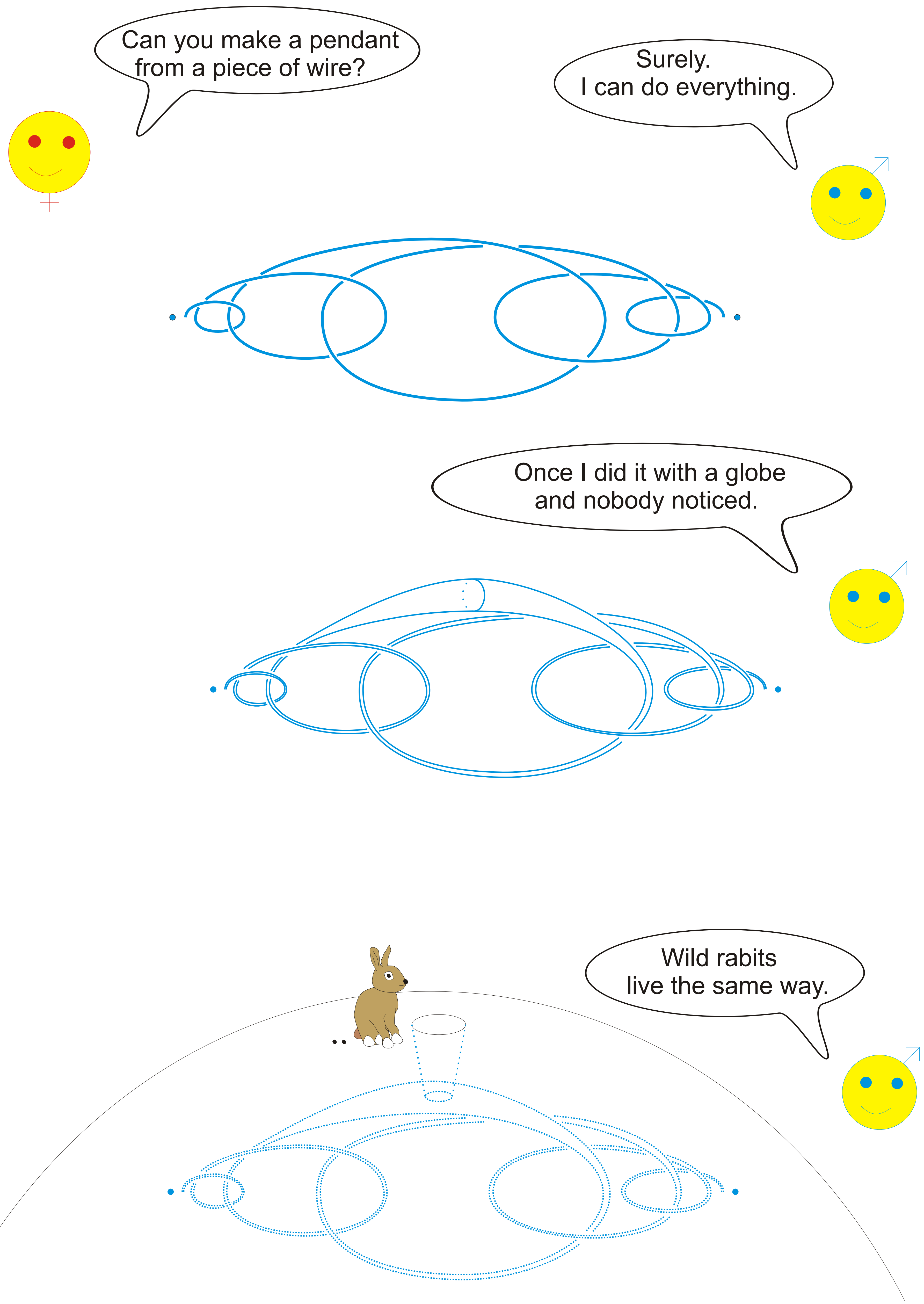




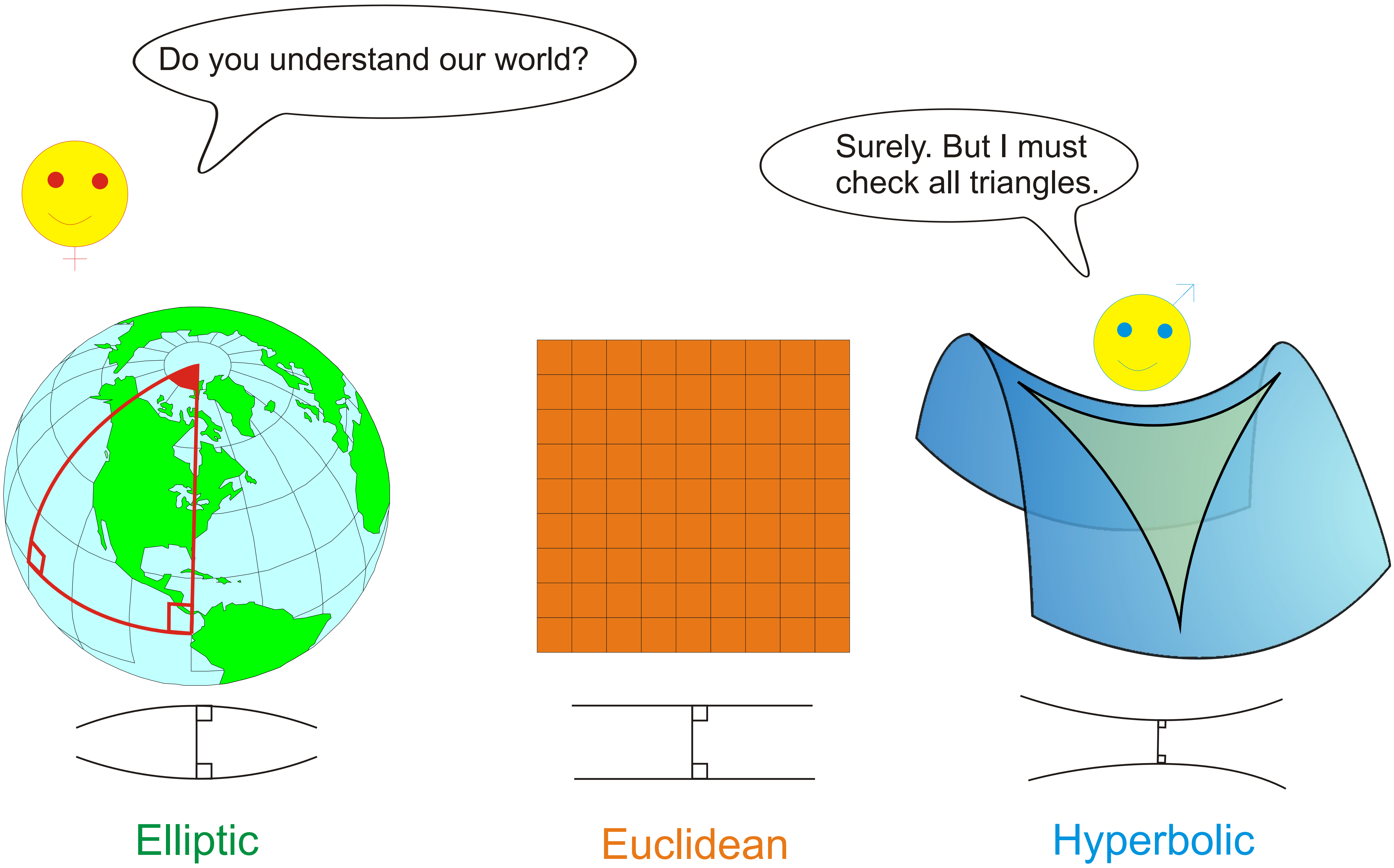


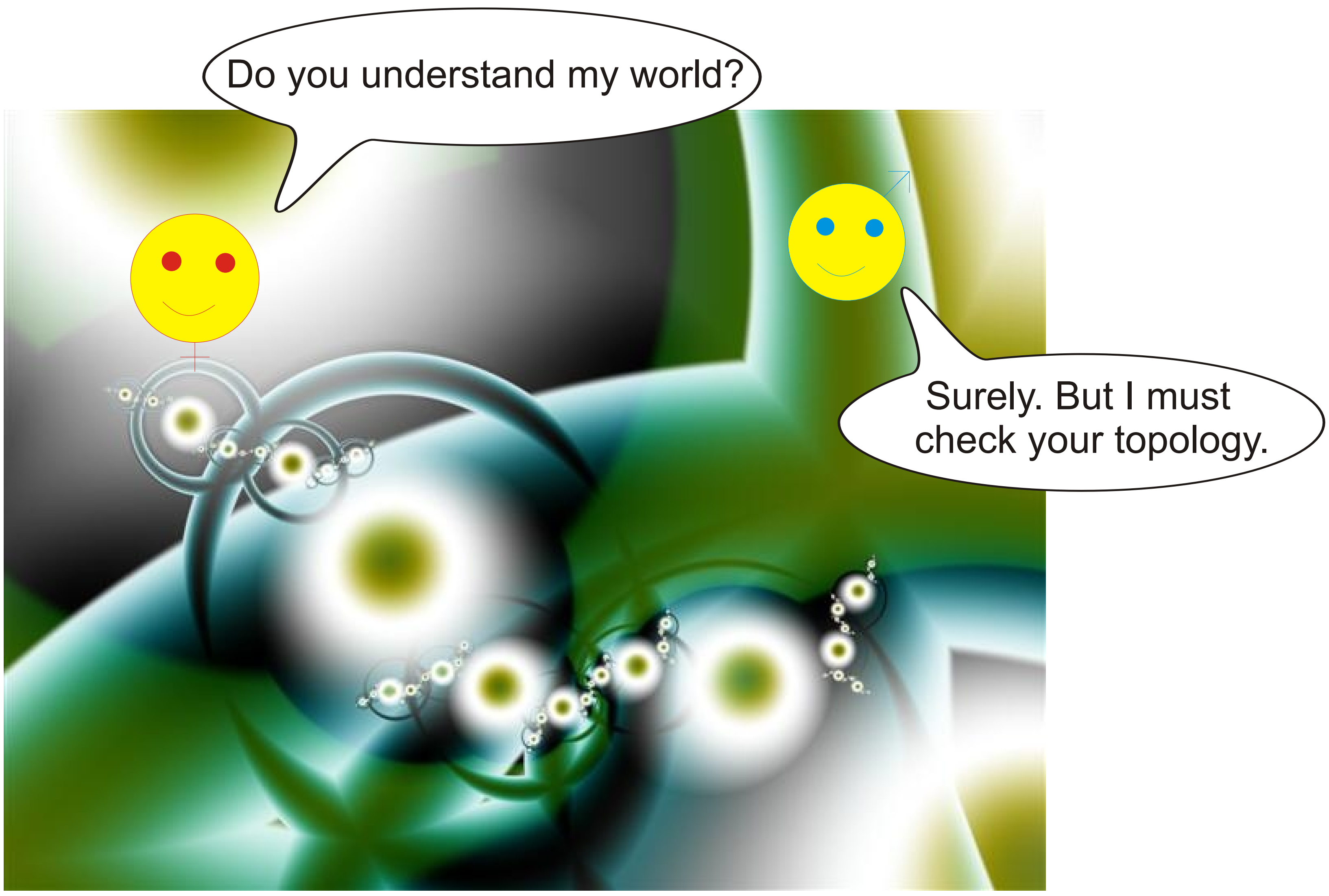
Keep in mind that
the pendant is solid, me too.

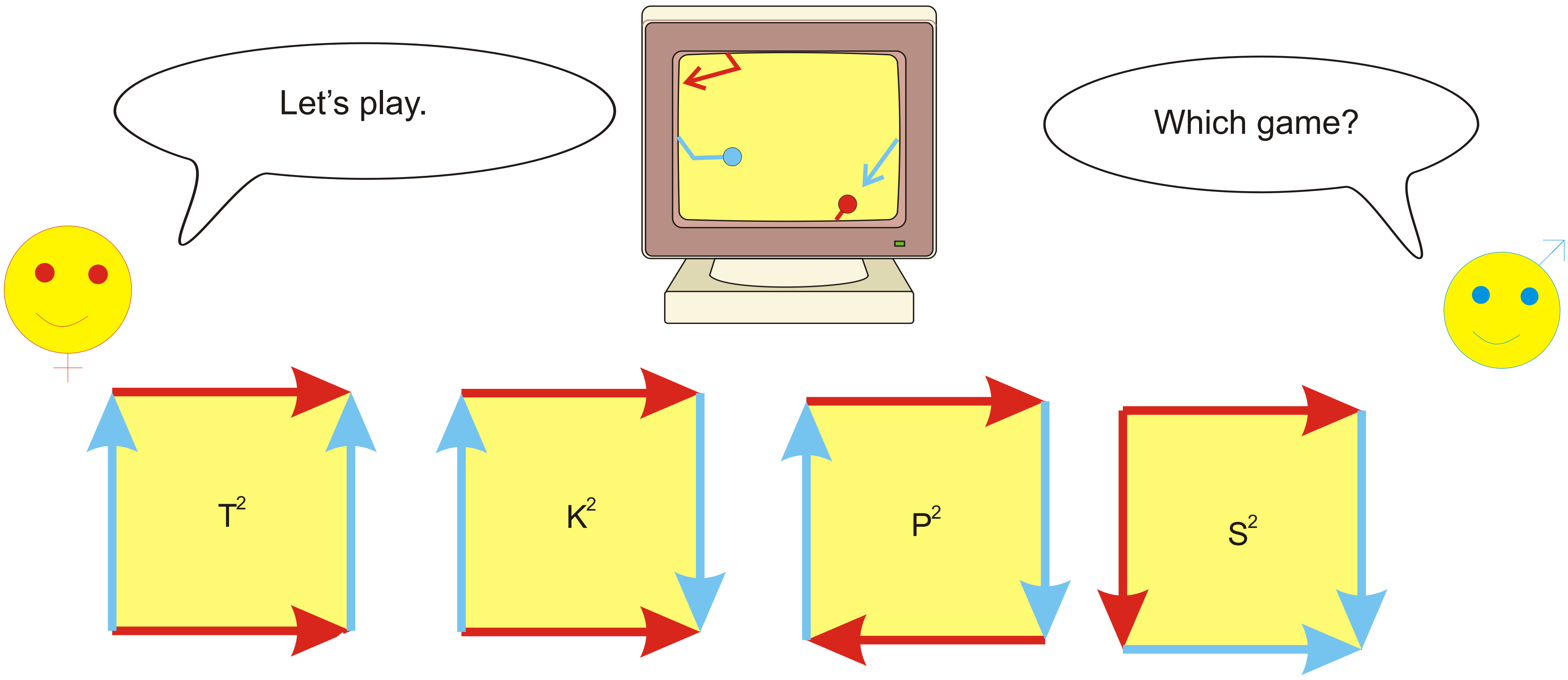




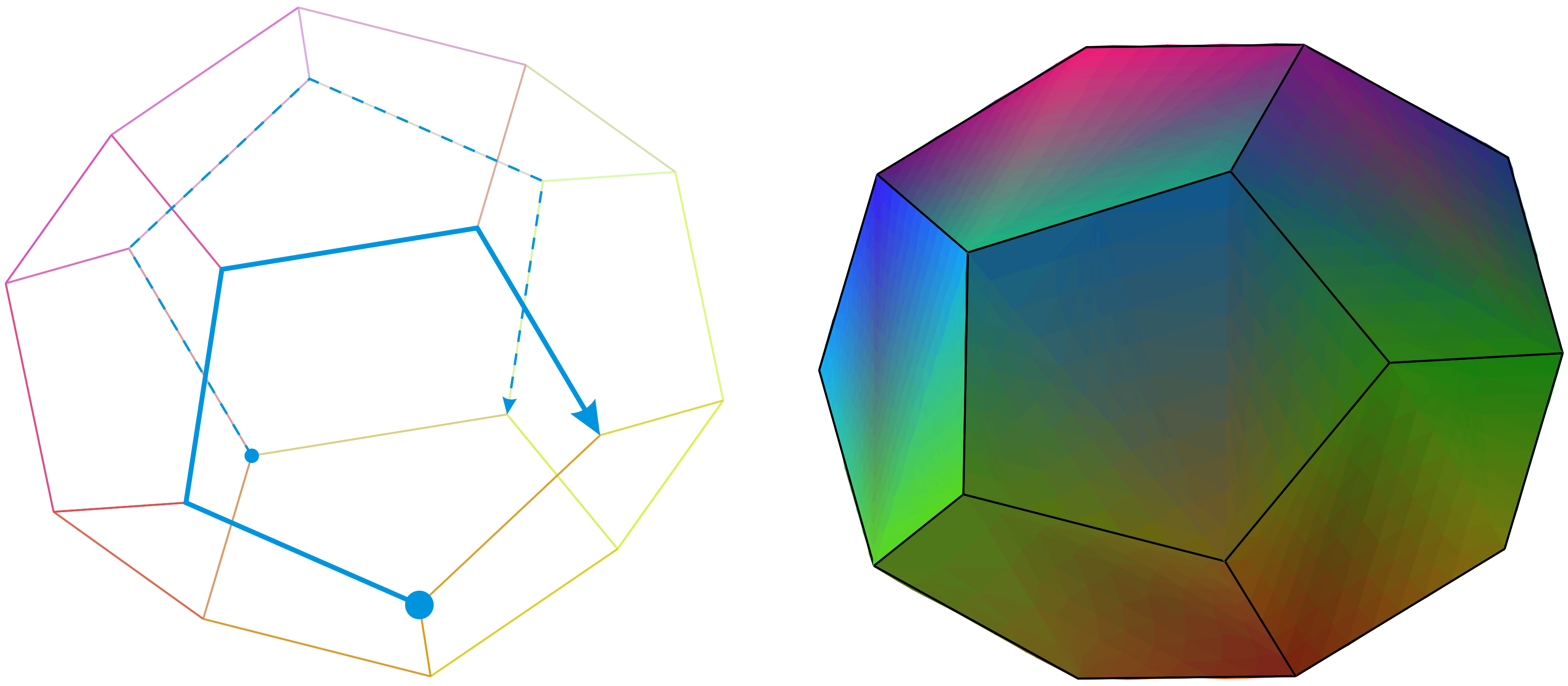
An arc can be embedded in the space in such a way that it's complement contains a circle not shrinkable to a point (wild arc and similarly wild ball and wild burrow, R.H. Fox & E. Artin 1948).

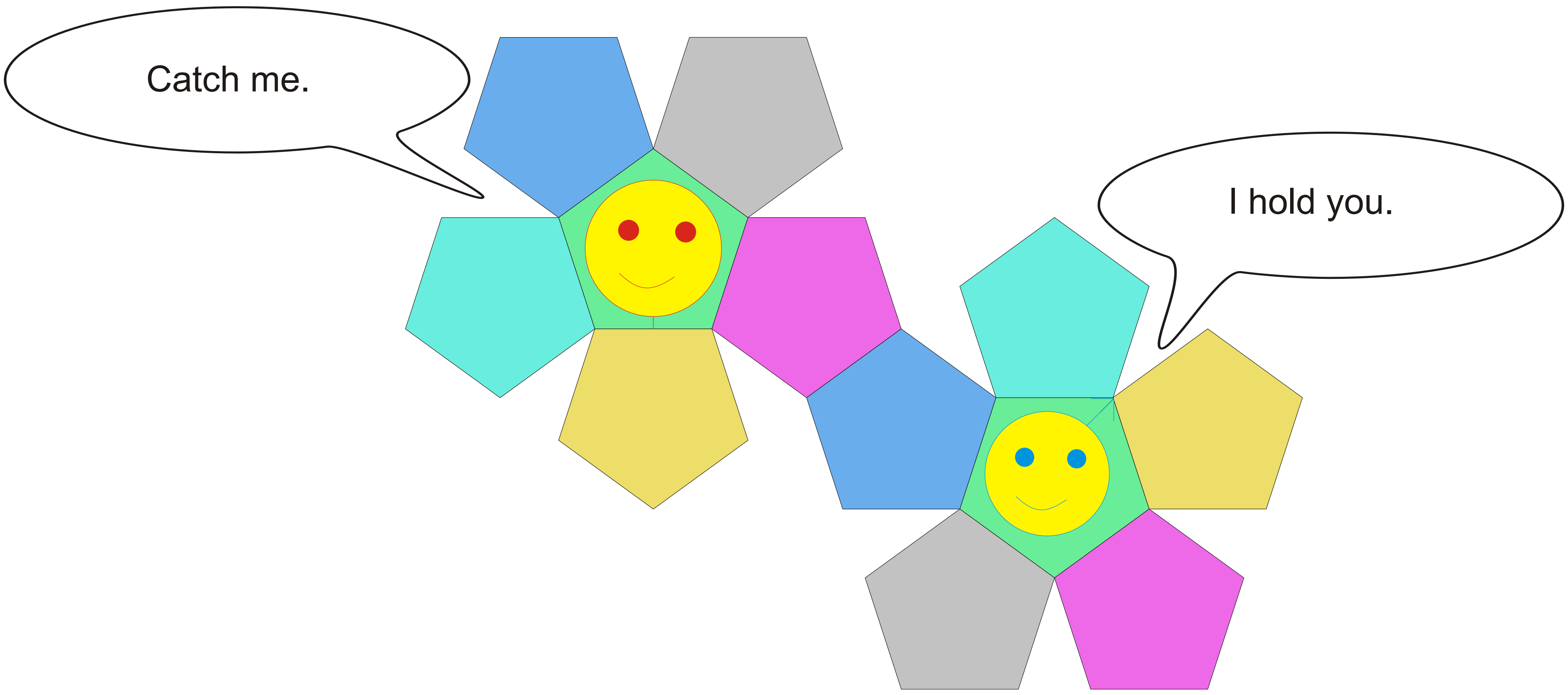

Do you understand our world?
Surely. But I must check all triangles.
Elliptic
Euclidean
Hyperbolic


Do you understand my world?
Surely. But I must check your topology.

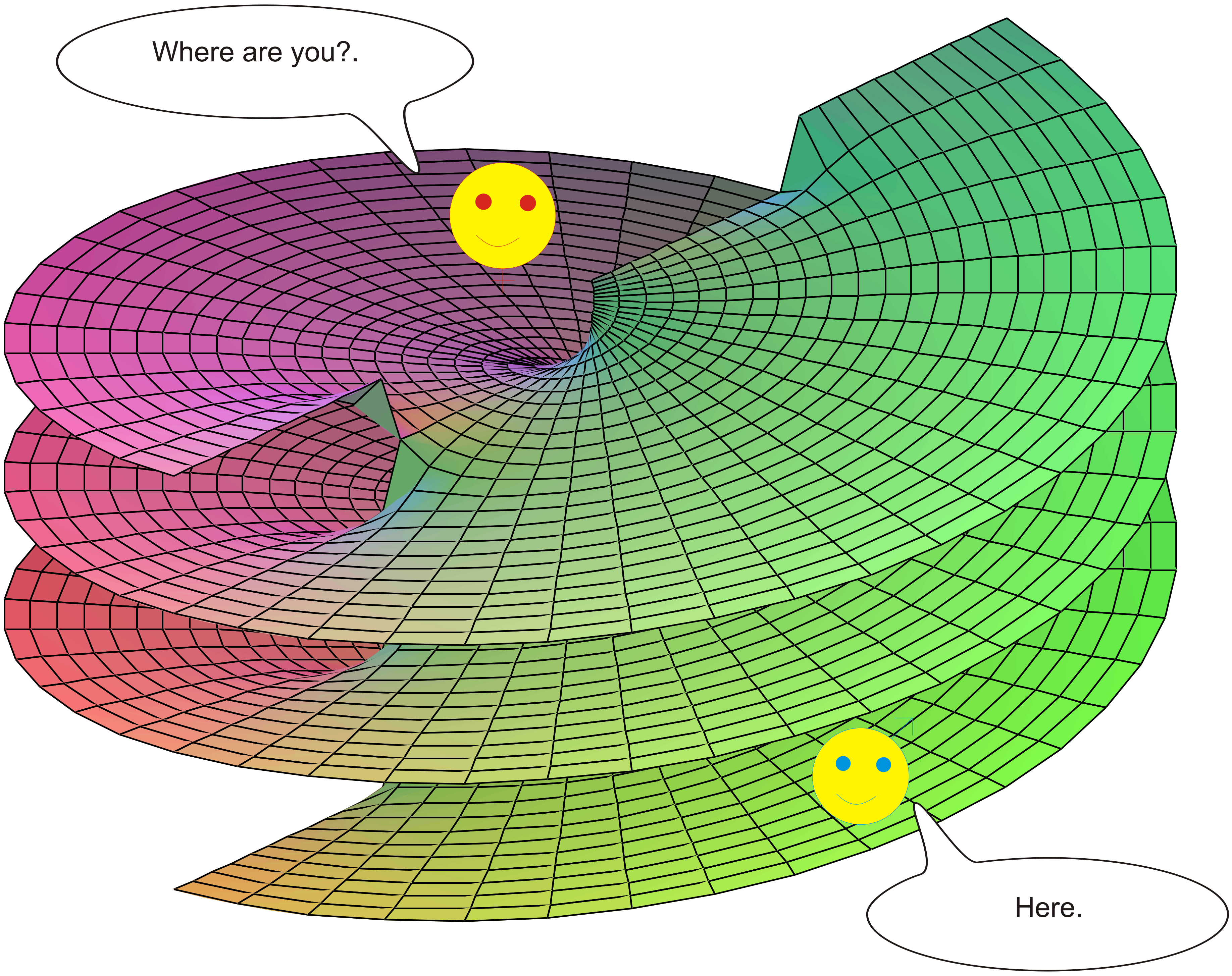


Identifying the oposite sides of the square we obtain four simplest “flat worlds” (torus S^2, Klein bottle K^2, projective plane P^2 and sphere S^2).

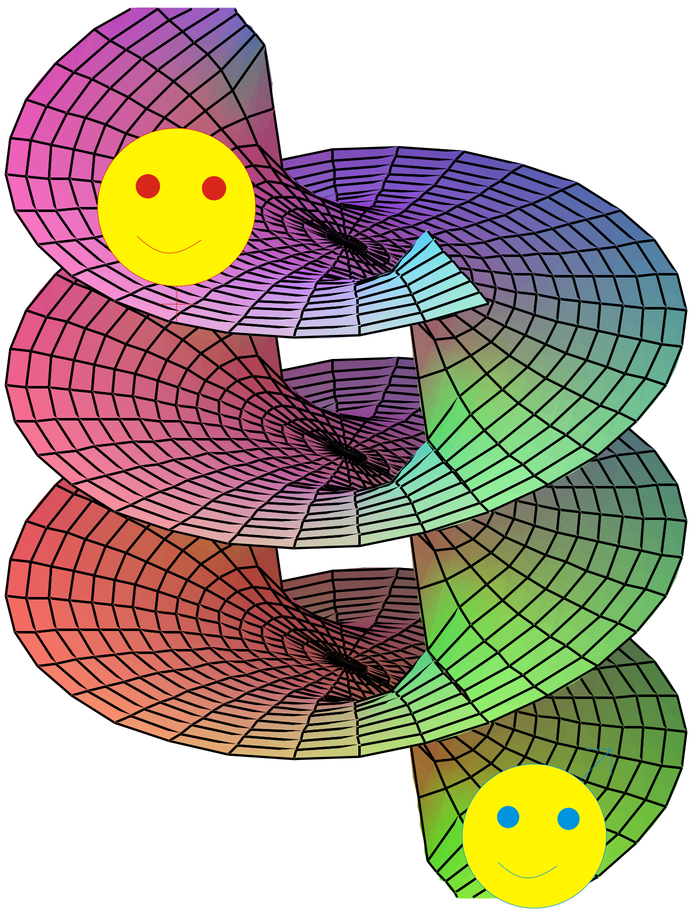


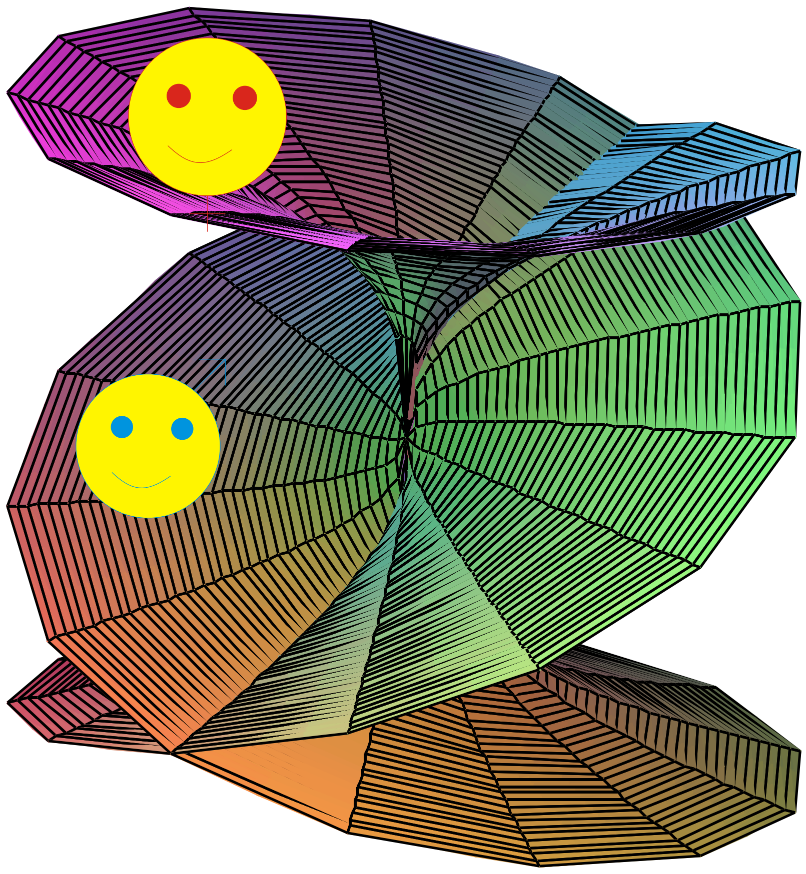


Identifying the opposite sides of the dodecahedron we obtain a strange (but possibly real) 3-D world with torus-like tunnels (Poincare homology sphere with a fundamental group of order 120, H. Poincare 1894).



A surface formed gluing thre log-like stairs with the same direction (imaginary part of log (x+1) + log (x-1) + log(x)).





Credits: Public domain files
http://commons.wikimedia.org/wiki/File:Newton-Fractal_2z3-2z%2B2.png
http://commons.wikimedia.org/wiki/File:Menger_sponge_(Level_1-4).jpg
http://commons.wikimedia.org/wiki/File:Sierpinski_carpet_4.svg
http://commons.wikimedia.org/wiki/File:Macke_-_Akt_mit_Korallenkette.jpg
http://commons.wikimedia.org/wiki/File:Alexander_horned_sphere.png
http://en.wikipedia.org/wiki/File:Hyperbolic_triangle.svg
http://commons.wikimedia.org/wiki/File:Fractal_Art_Spheres.JPG