

THE UTAH TEAPOT

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A Utah Teapot with the HTTP error code for "I'm a Teapot" on it. Picture by [Windell Oskay](#) / CC BY 2.0

A teapot primitive is considered the equivalent of a "hello, world" program, as a way to create an easy 3D scene with a somewhat complex model acting as a basic geometry reference for scene and light setup. Some programming libraries, such as the OpenGL Utility Toolkit, even have functions dedicated to drawing teapots.

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Website by Valery Marier for YSDN 1006.

Article Source: [Wikipedia.org](#)

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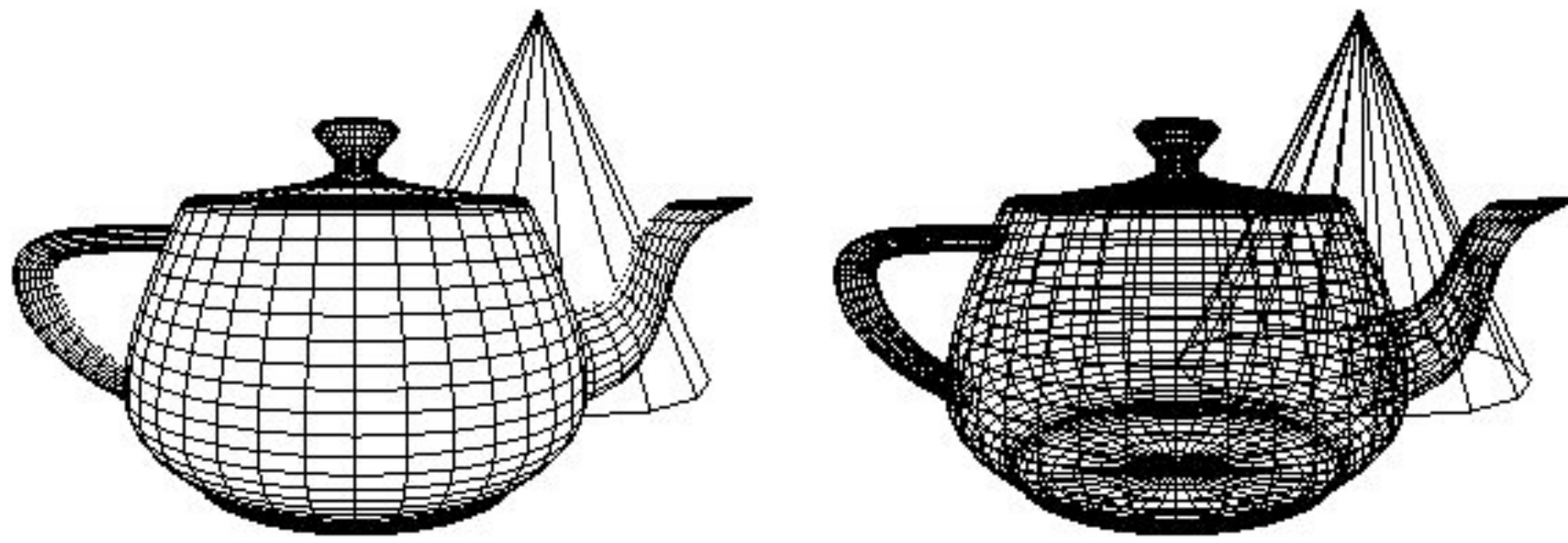
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HISTORY

For his work, Newell needed a simple mathematical model of a familiar object. His wife, Sandra Newell, suggested modelling their tea service since they were sitting down for tea at the time. He sketched the teapot free-hand using graph paper and a pencil. Following that, he went back to the computer laboratory and edited bézier control points on a Tektronix storage tube, again by hand.

The teapot shape contained a number of elements that made it ideal for the graphics experiments of the time: it was round, contained saddle points, had a genus greater than zero because of the hole in the handle, could project a shadow on itself, and could be displayed accurately without a



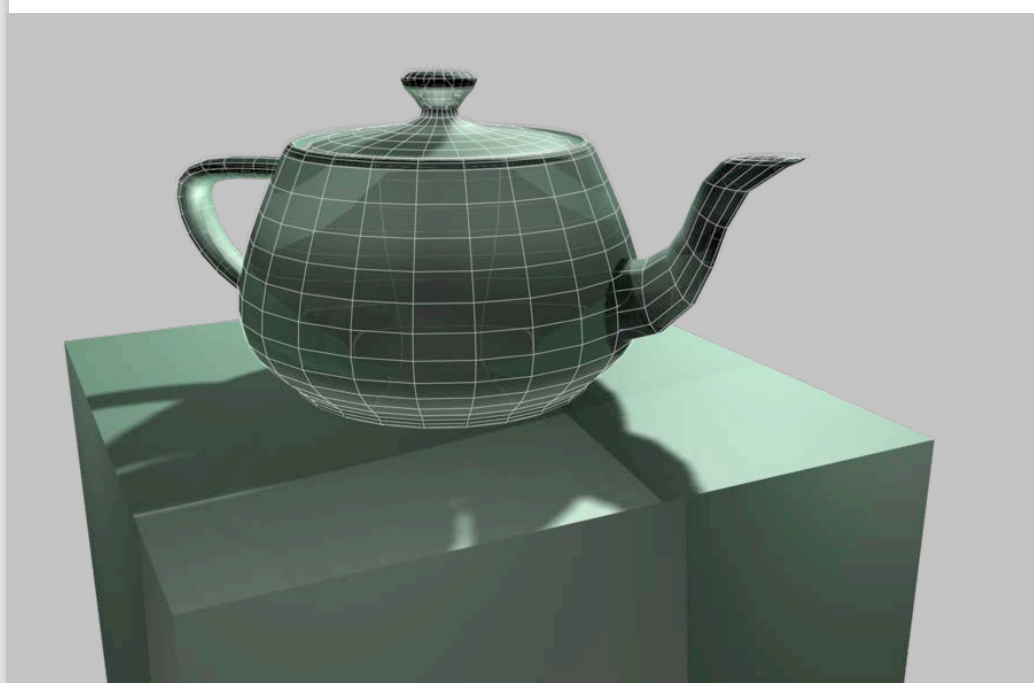
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Over the following decades, editions of computer graphics journals (such as the ACM SIGGRAPH's quarterly) regularly featured versions of the teapot: faceted or smooth-shaded, wireframe, bumpy, translucent, refractive, even leopard-skin and furry teapots were created.

Having no surface to represent its base, the original teapot model was not intended to be seen from below. Later versions of the data set fixed this.

The real teapot is ~33% taller (ratio 4:3) than the computer model. Jim Blinn stated that he scaled the model on the vertical axis during a demo in the lab to demonstrate that they could manipulate it. They preferred the appearance of this new version and decided to save the file out of that preference.



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Versions of the teapot model — or sample scenes containing it — are distributed with or freely available for nearly every current rendering and modelling program and even many graphic APIs, including AutoCAD, Houdini, Lightwave 3D, MODO, POV-Ray, 3ds Max, and the OpenGL and Direct3D helper libraries. Some RenderMan-compliant renderers support the teapot as a built-in geometry by calling `RiGeometry("teapot", RI_NULL)`. Along with the expected cubes and spheres, the GLUT library even provides the function `glutSolidTeapot()` as a graphics primitive, as does its Direct3D counterpart `D3DX(D3DXCreateTeapot())`. However version 11 of DirectX does not provide this functionality anymore. Mac OS X Tiger and Leopard also include the teapot as part of Quartz Composer; Leopard's teapot supports bump mapping. BeOS included a small demo of a rotating 3D teapot, intended to show off the platform's multimedia facilities.

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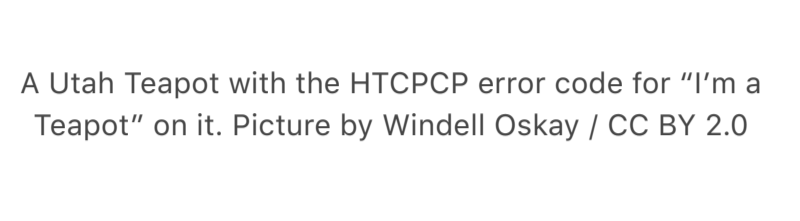
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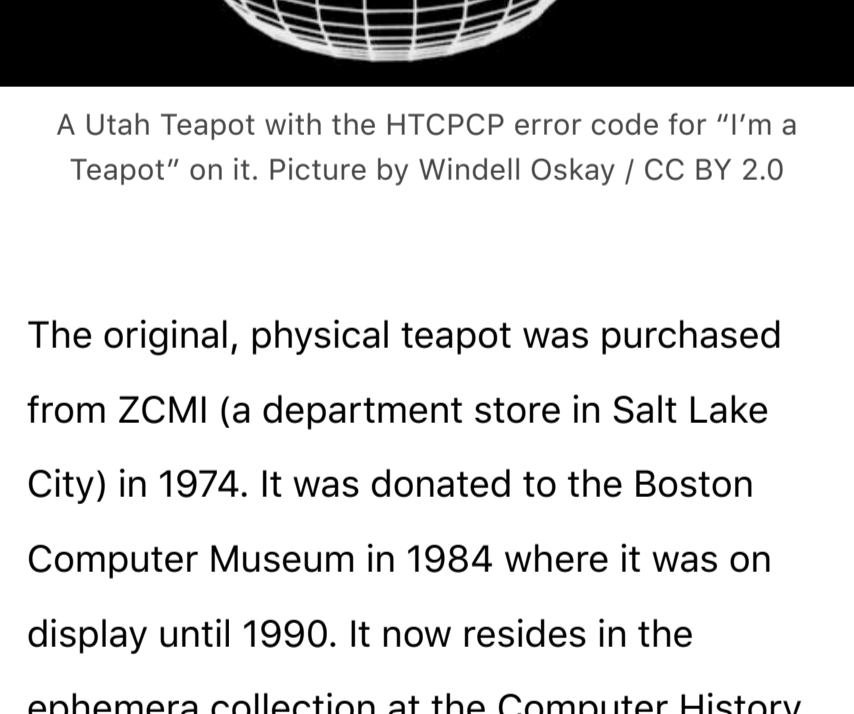
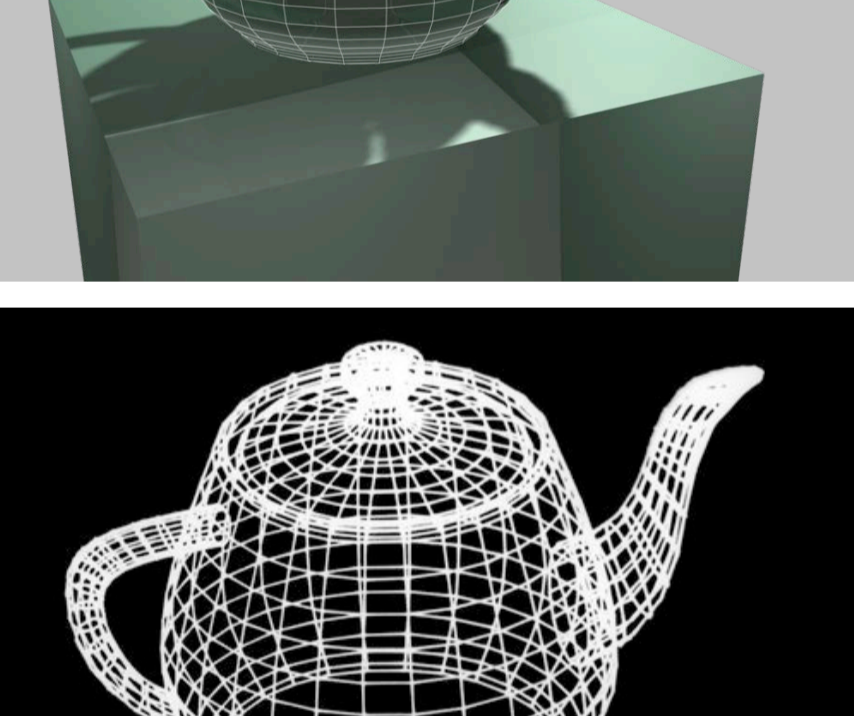
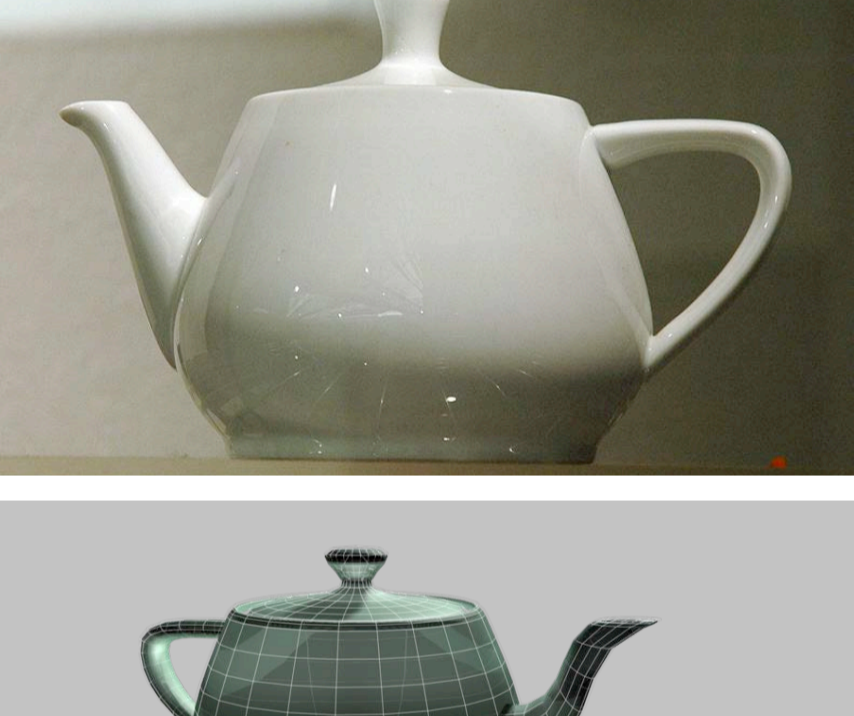
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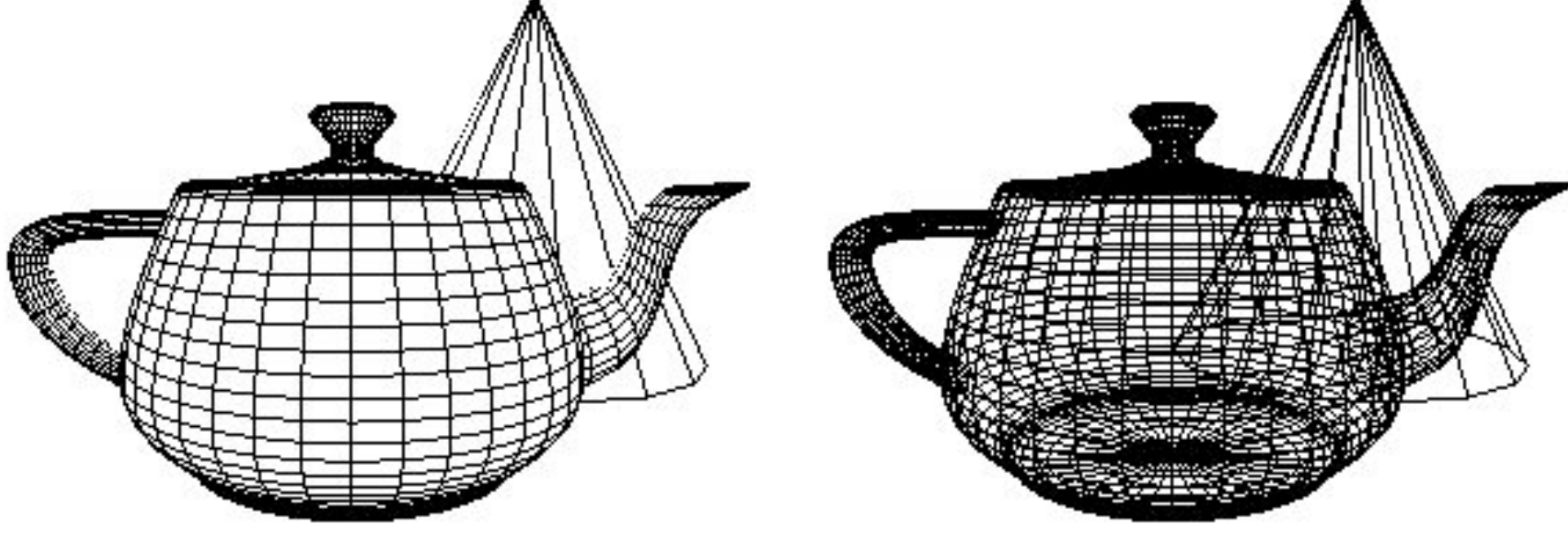
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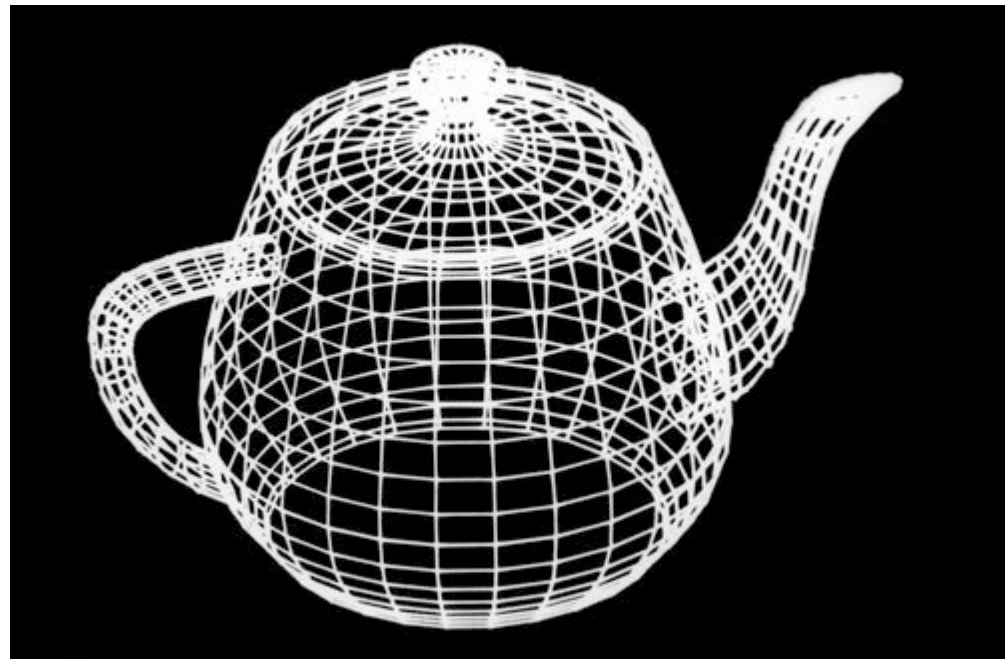
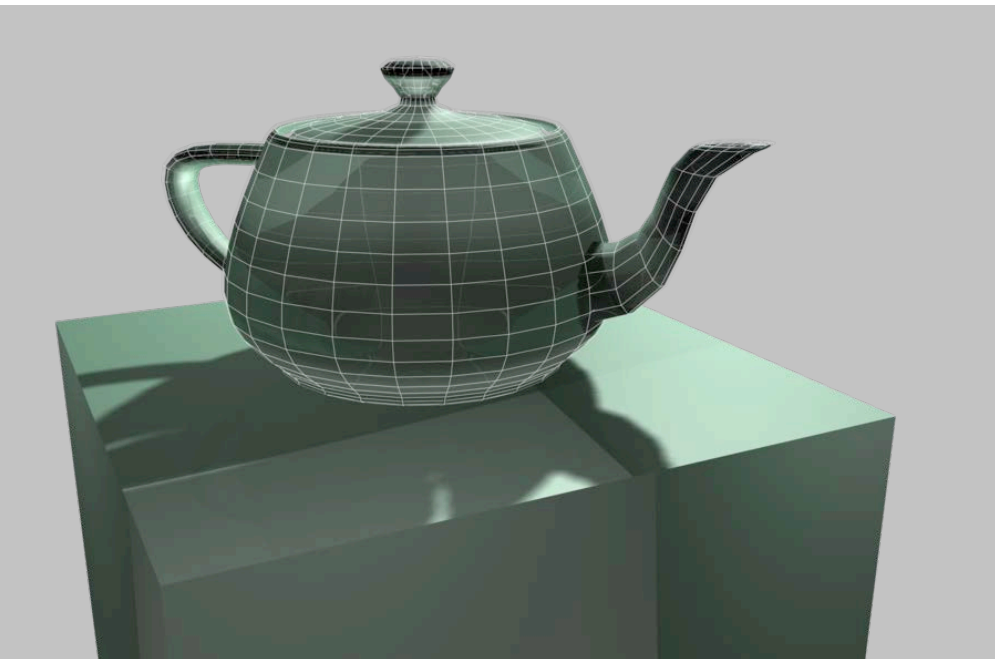
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Jim Blinn (in one of his "Project MATHEMATICS!" videos) proves an amusing (but trivial) version of the Pythagorean theorem: Construct a (2D) teapot on each side of a right triangle and the area of the teapot on the hypotenuse is equal to the sum of the areas of the teapots on the other two sides.

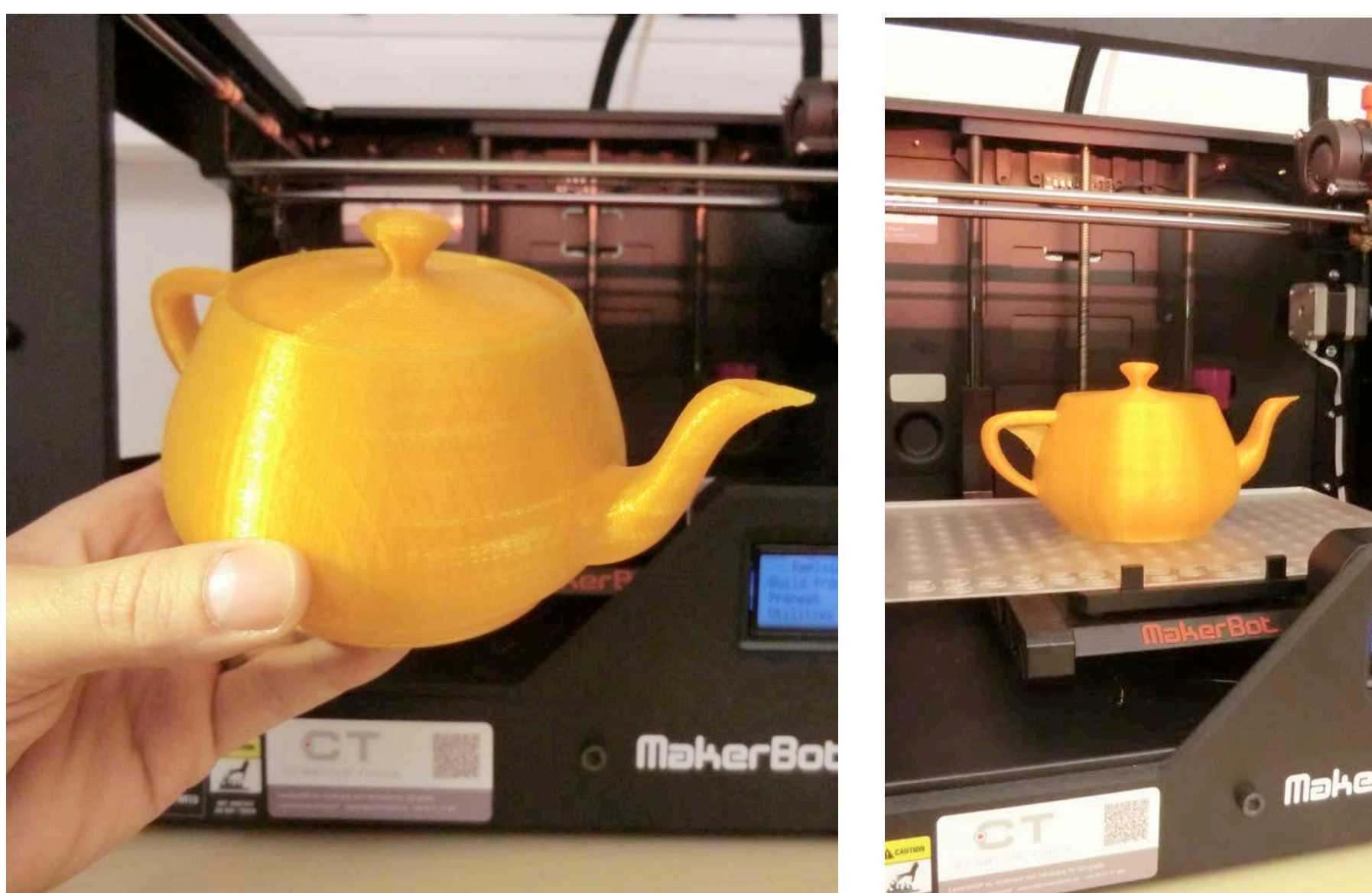
Loren Carpenter's 1980 CGI film *Vol Libre* features the teapot, appearing briefly at the beginning and end of the film in the foreground with a fractal-rendered mountainscape behind it.

IN POP CULTURE

With the advent of the first computer generated short films and proceeding full-length feature films, it has become an in-joke to hide the Utah teapot in one of the film's scenes. For example, in the movie *Toy Story*, the Utah teapot appears in a short tea-party scene. The teapot also appears in *The Simpsons* episode "Treehouse of Horror VI" in which Homer discovers the "third dimension." It also appears in Pixar's *Monsters, Inc.* on the table in Boo's bedroom.

3D PRINTING

Through 3D printing, the Utah Teapot has come full circle from being a computer model based on an actual teapot to being an actual teapot based on the computer model. It is widely available in many renderings in different materials from small plastic knick-knacks to a fully functional ceramic teapot. It is sometimes intentionally rendered as a blocky, low poly object to celebrate its origin as a computer model.



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In 2009, the Belgian design studio, *Unfold*, 3D printed the Utah Teapot in ceramic with the objective of returning the iconographic teapot to its roots as a piece of functional dish-ware while showing its status as an icon of the digital world.

In 2015, the California-based company and self-described "Make-Tank", *Emerging Objects*, followed suit, but this time printed the teapot, along with teacups and teaspoons, out of actual tea.

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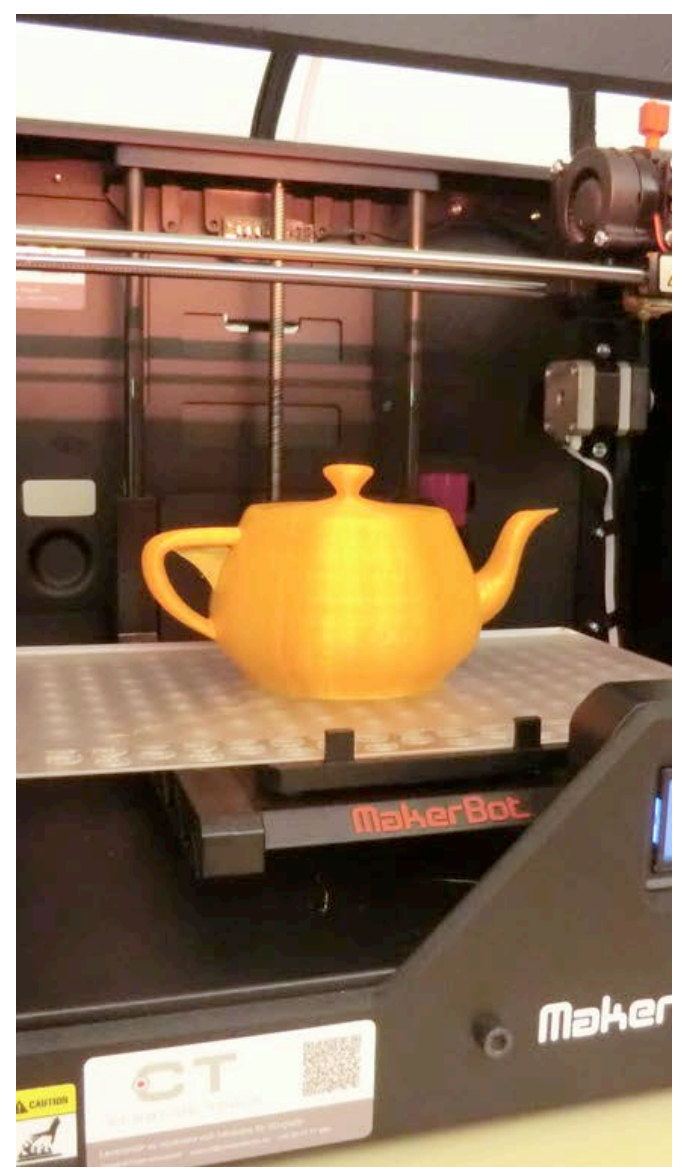
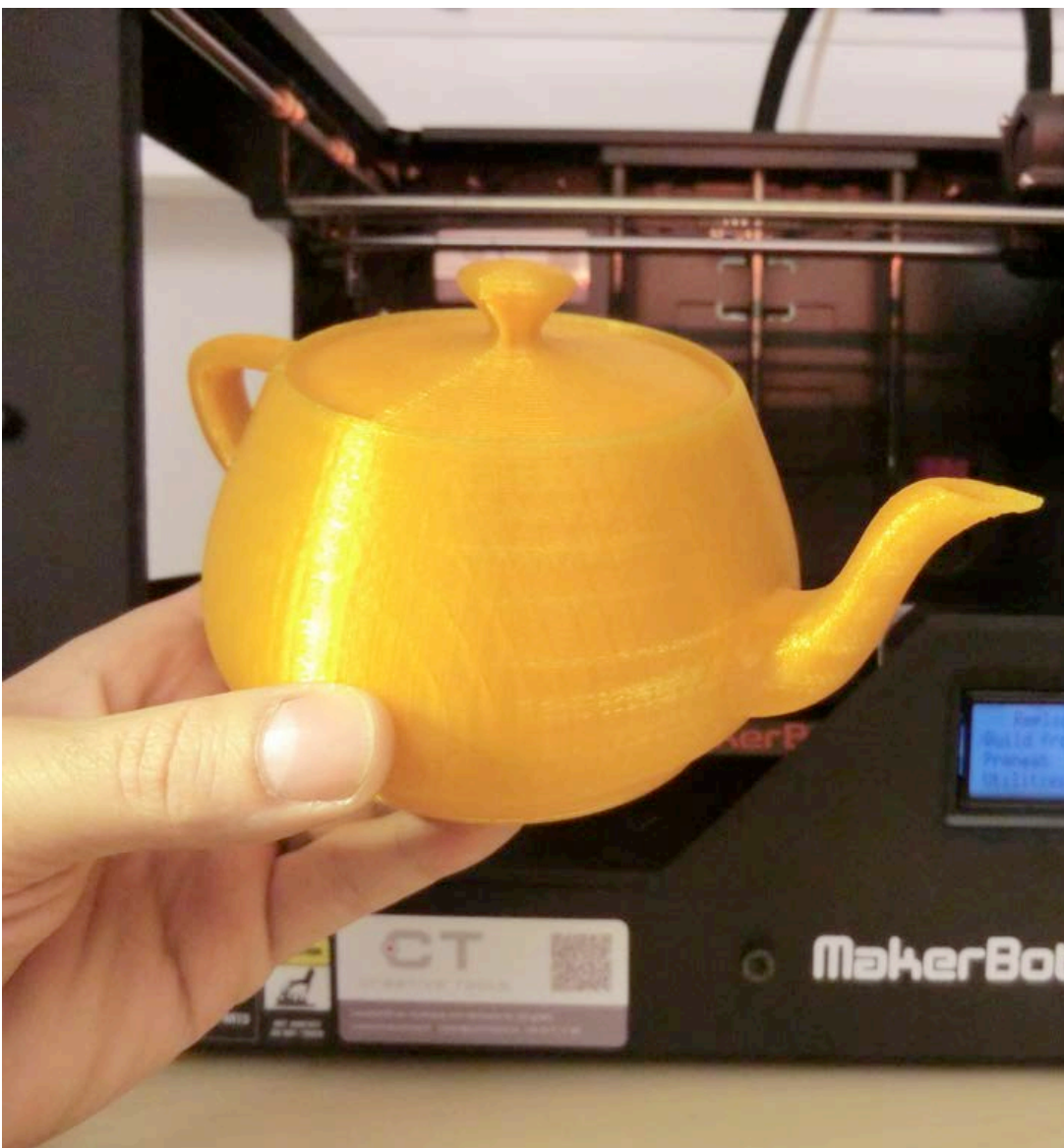
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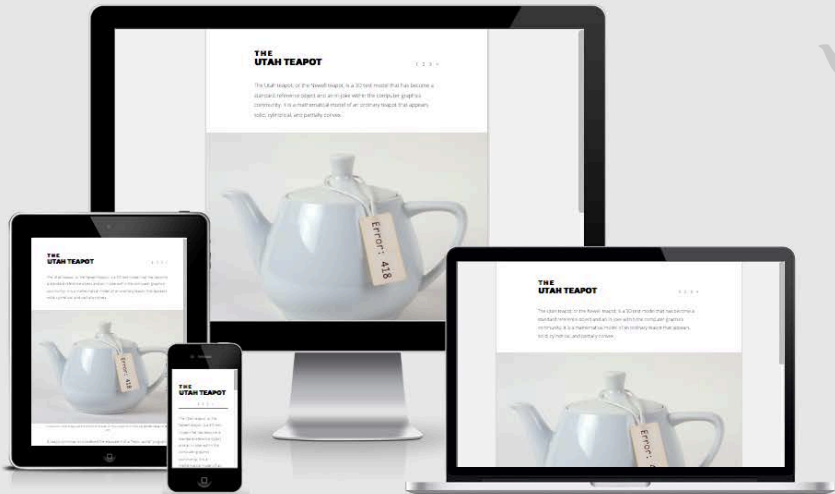
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