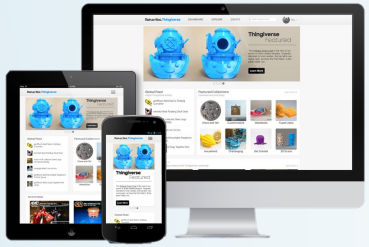
DISEÑO 3D

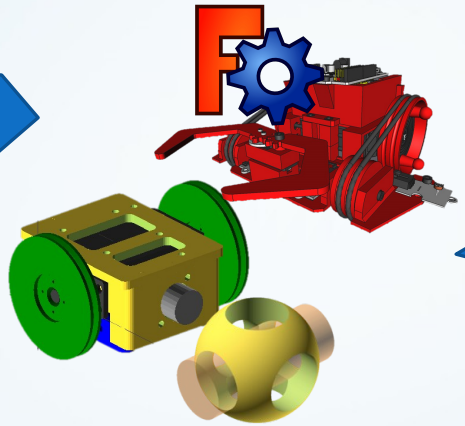
TUBOT 2016

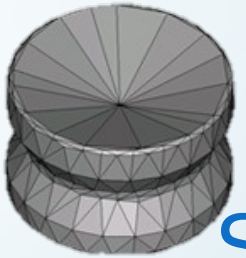
Universidad de Alcalá

Departamento de Electrónica

Introducción

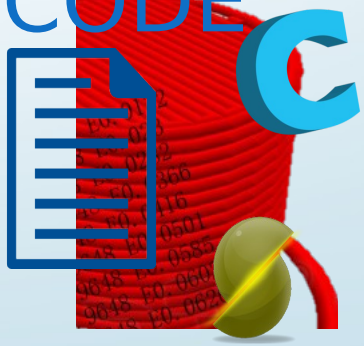


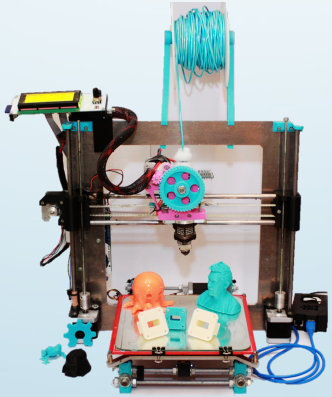


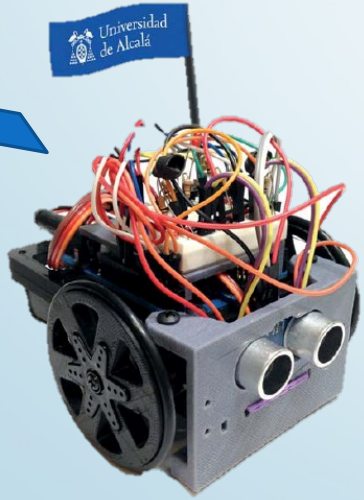


.STL

.GCODE







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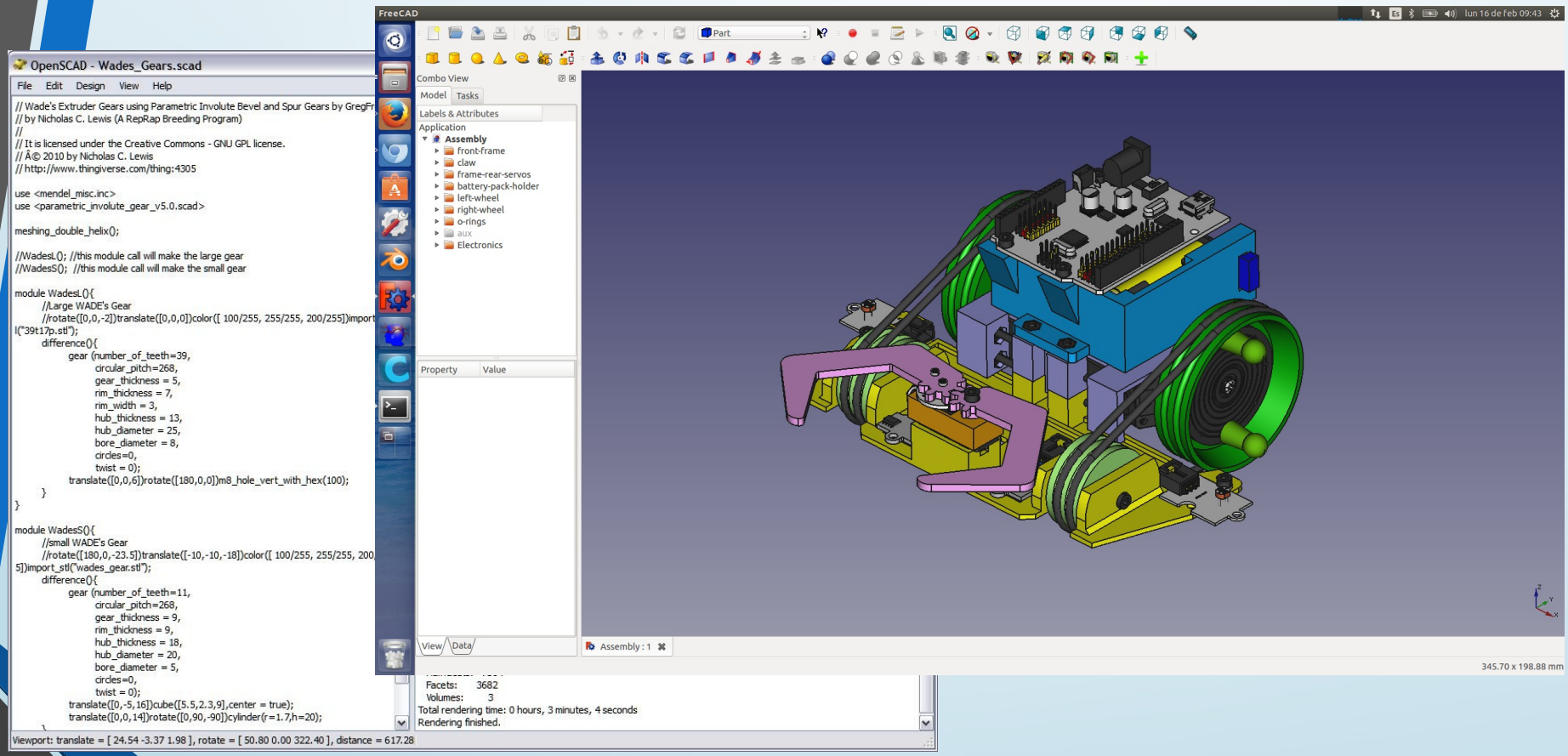
OpenSCAD vs FreeCAD



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OpenSCAD

- Introducción
- Entorno
- Programación
- Ejemplos

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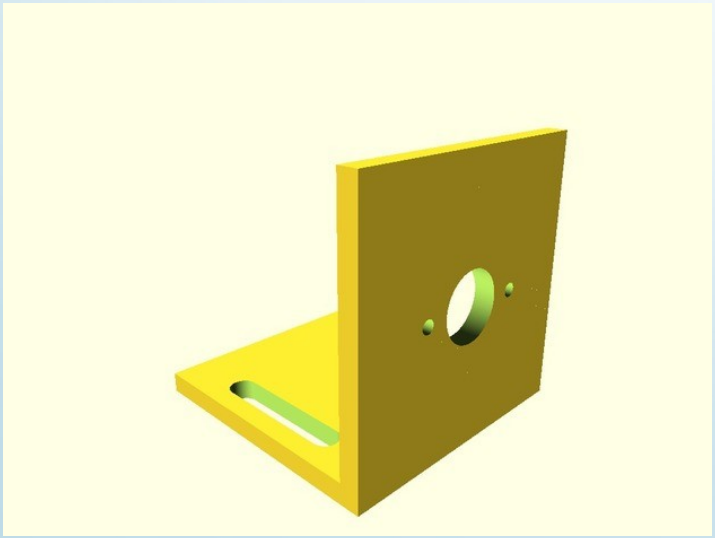
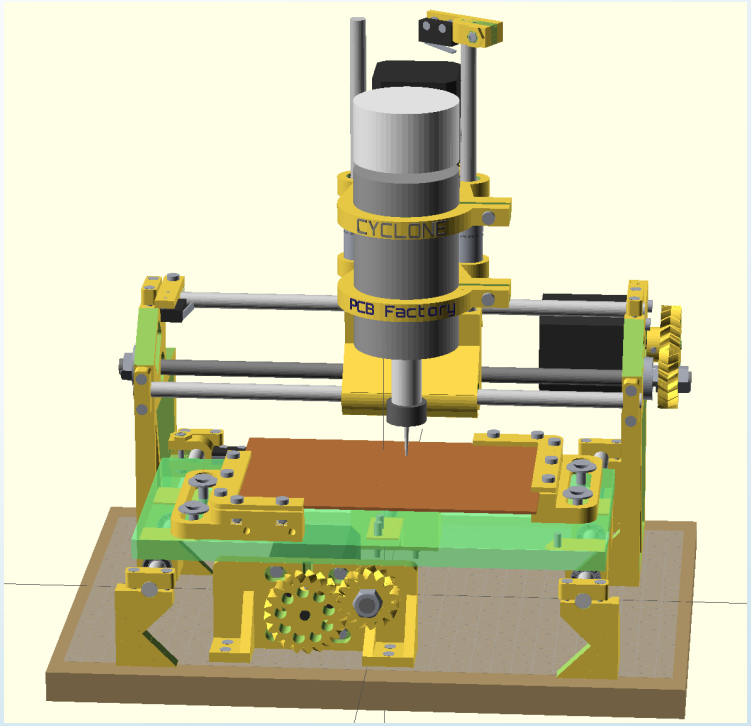
Introducción

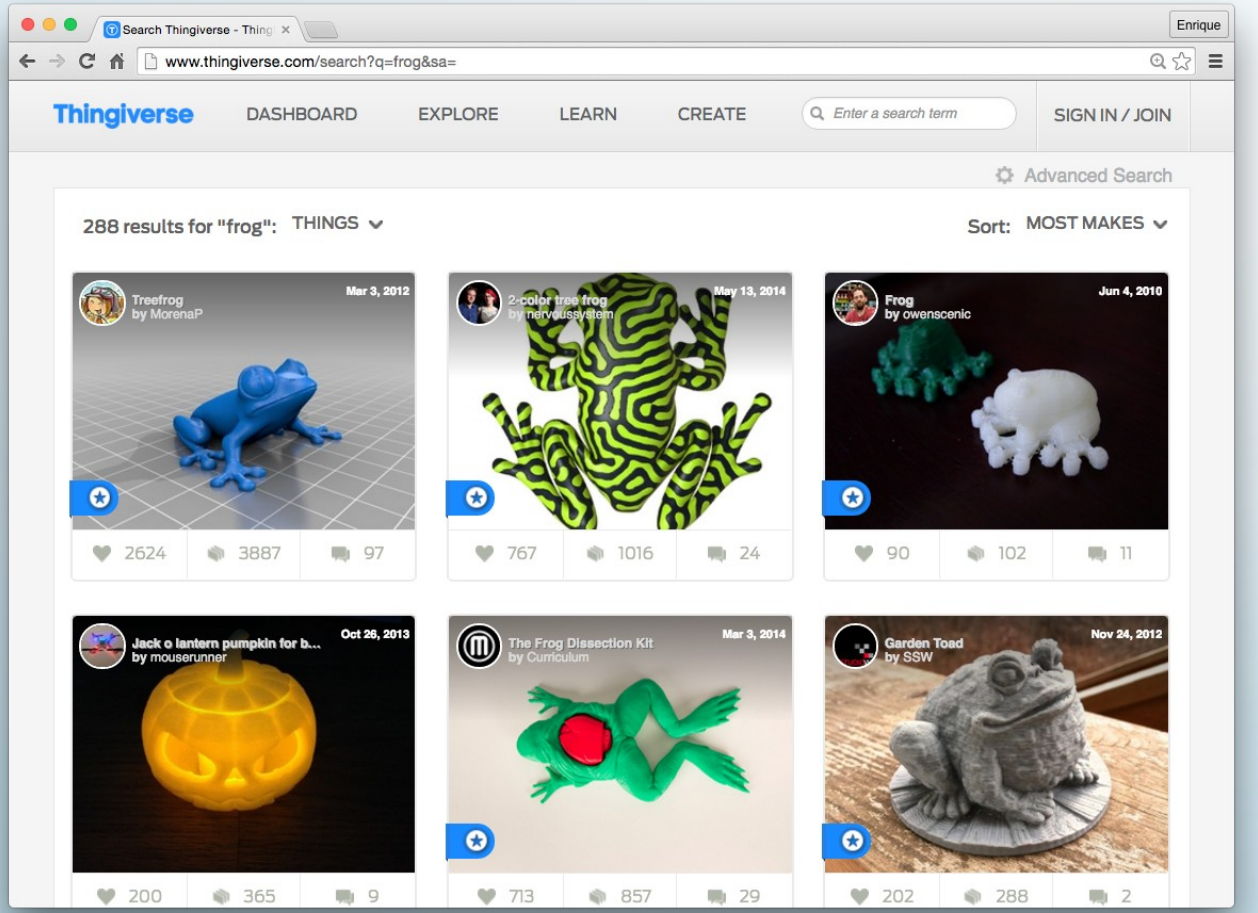
- Software libre GPL
- Disponible para Linux, Windows
- Diseño por programación
- www.openscad.org





Introducción

- www.thingverse.com
  - Se pueden encontrar modelos compilados y fuentes



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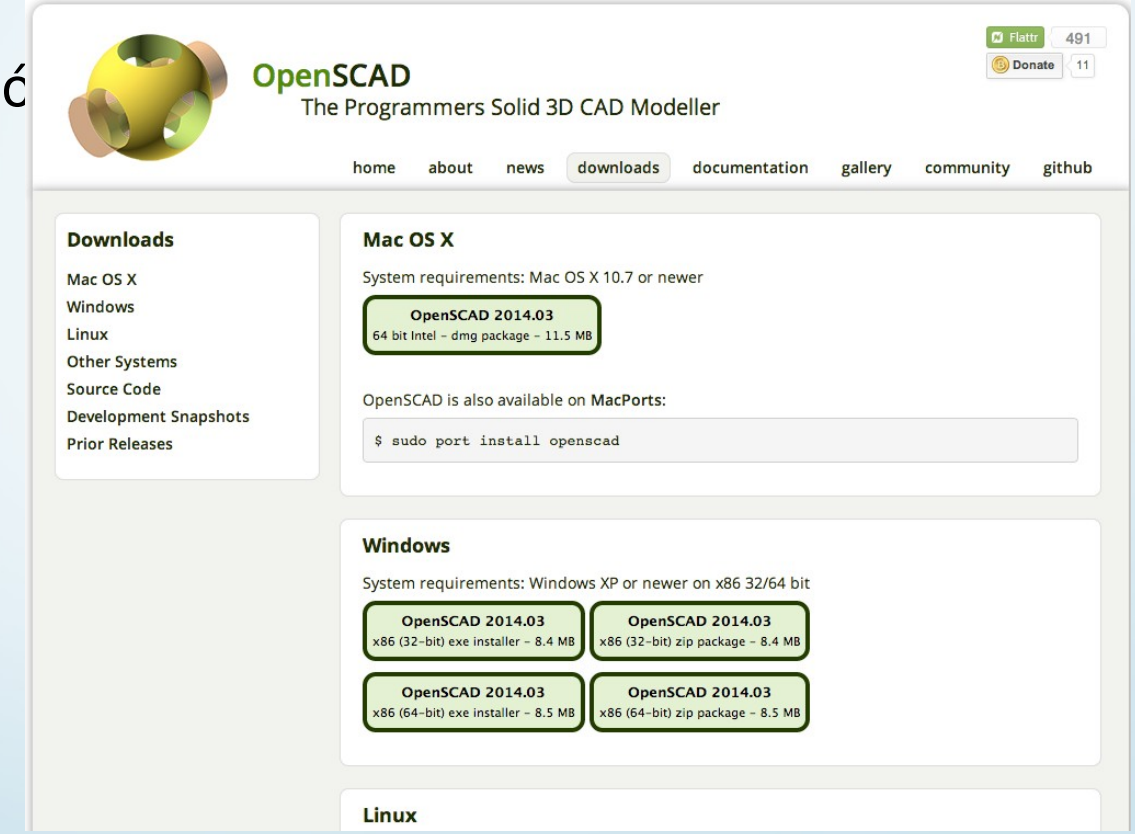
Introducción

- www.openscad.org
  - Descargas
  - Documentació
    - Manual
    - Librerías
  - Galería
  - ...



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Introducción

- Documentación
  - http://en.wikibooks.org/wiki/OpenSCAD_User_Manual

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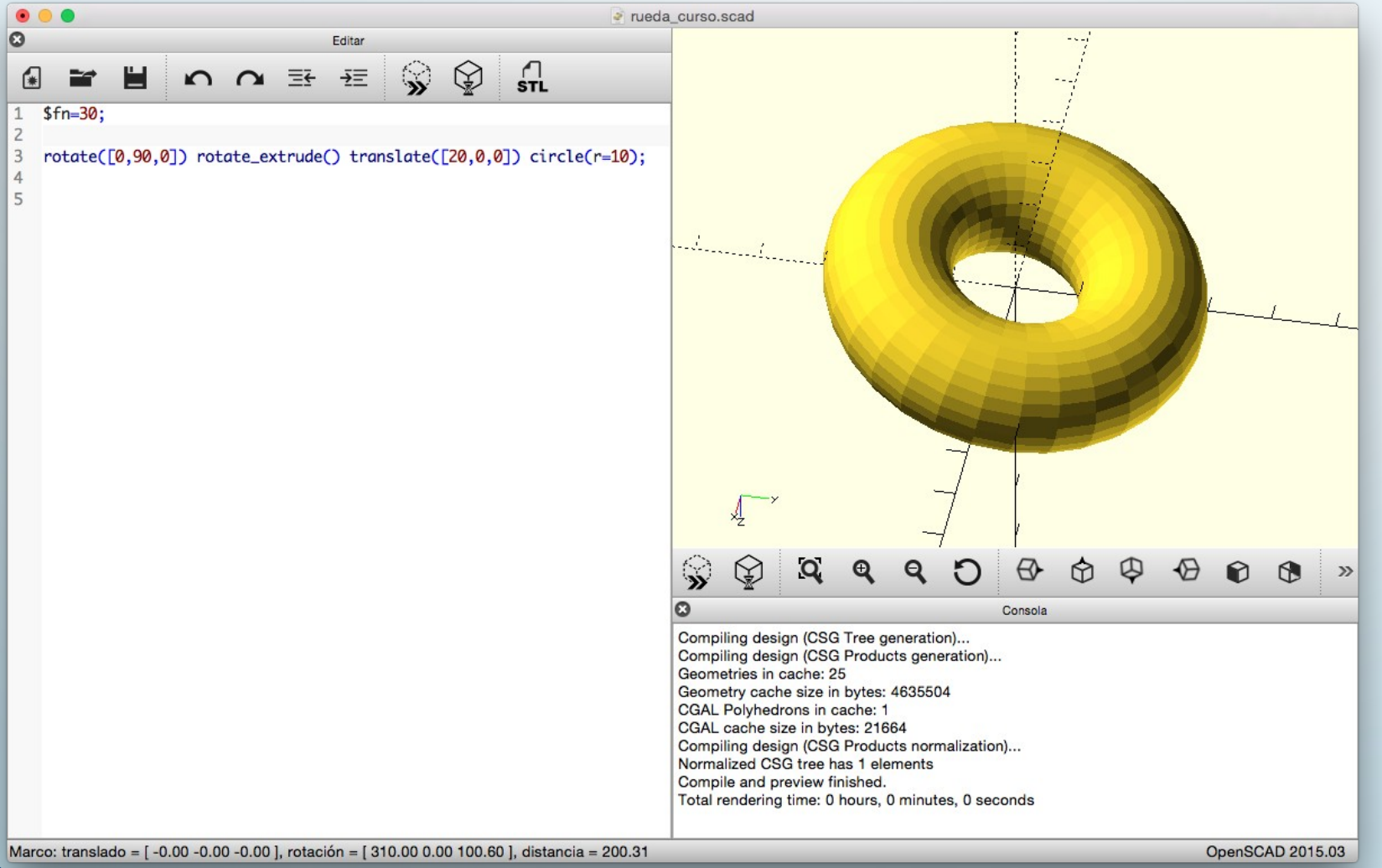
Entorno



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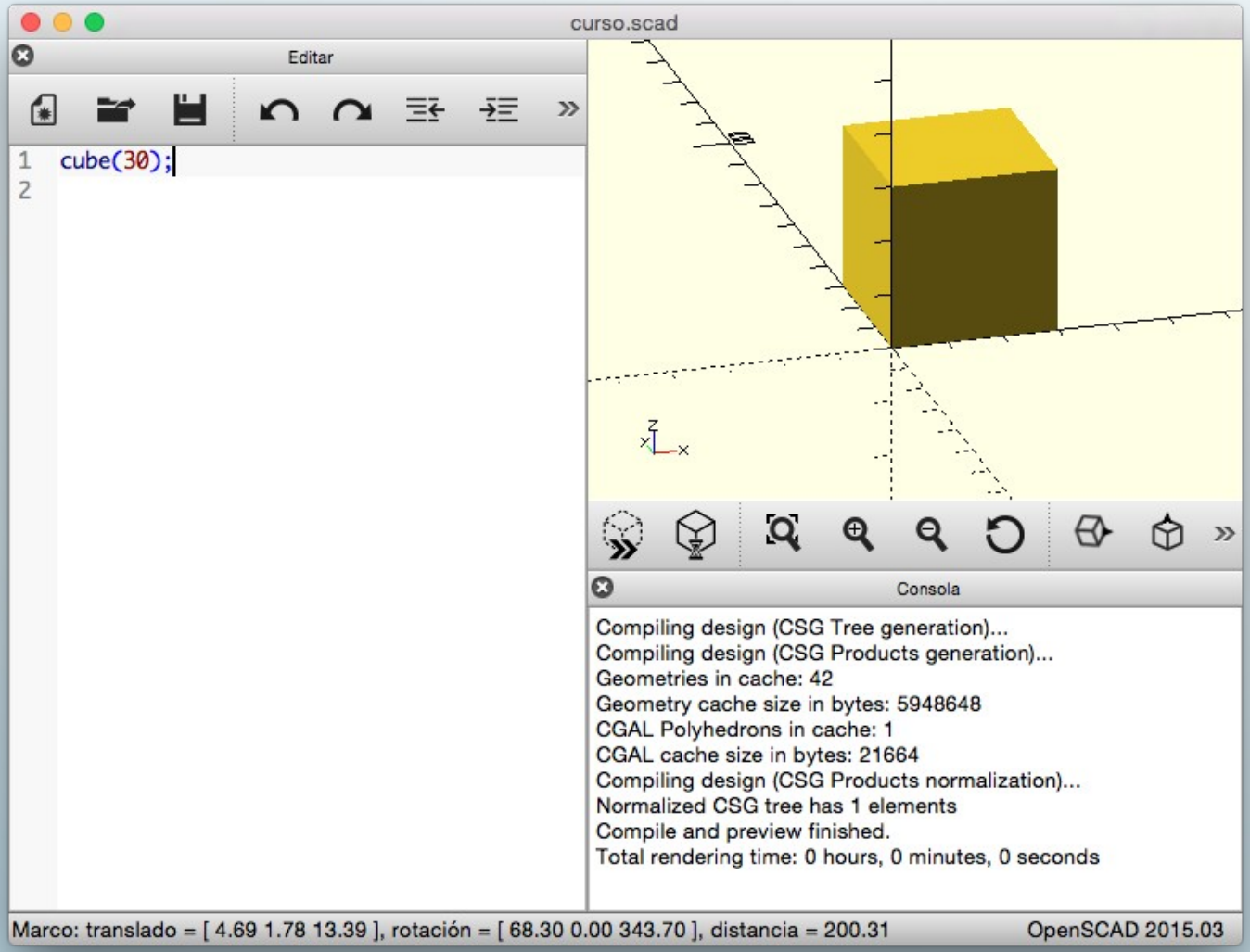
Programación

- Diseño de un cubo



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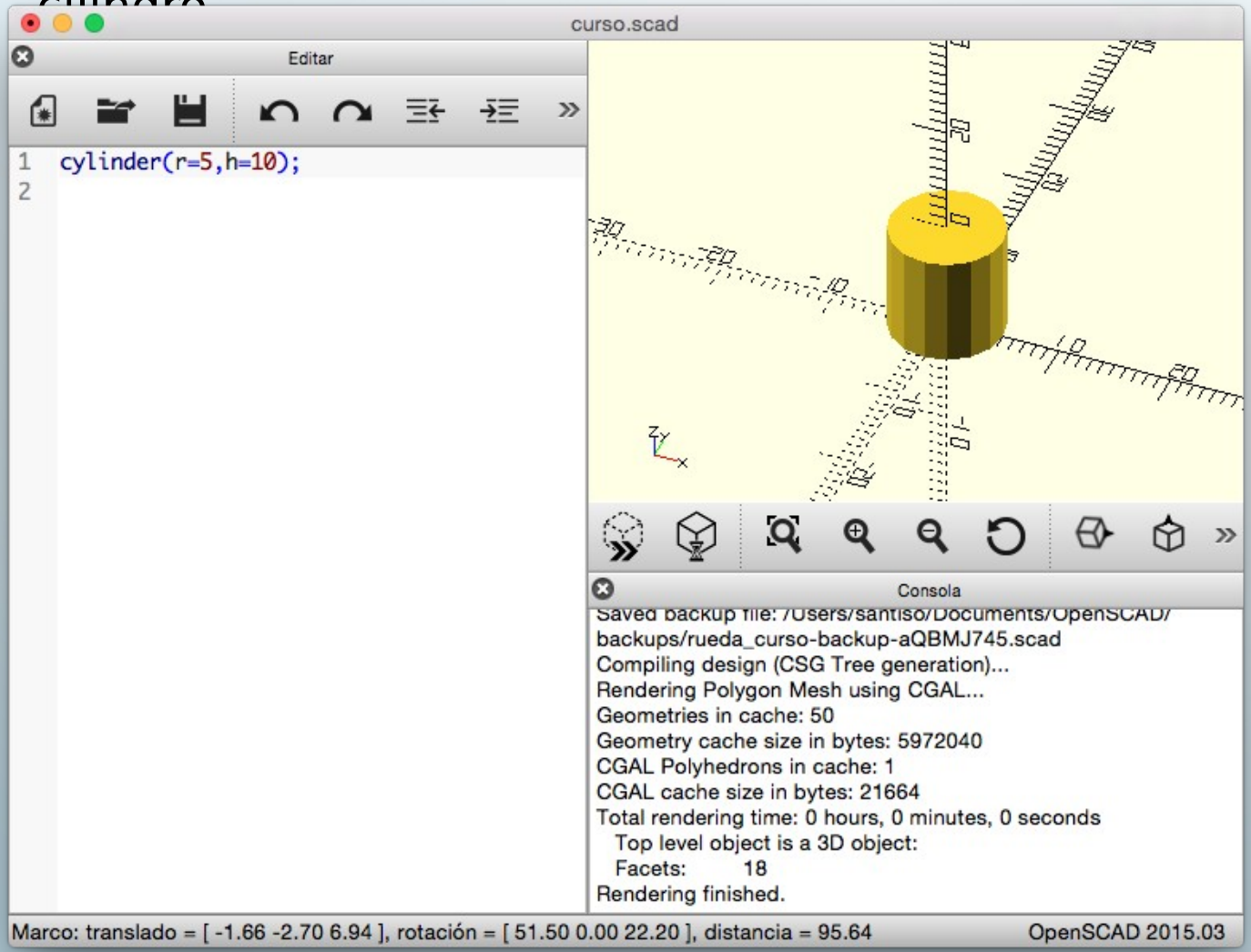
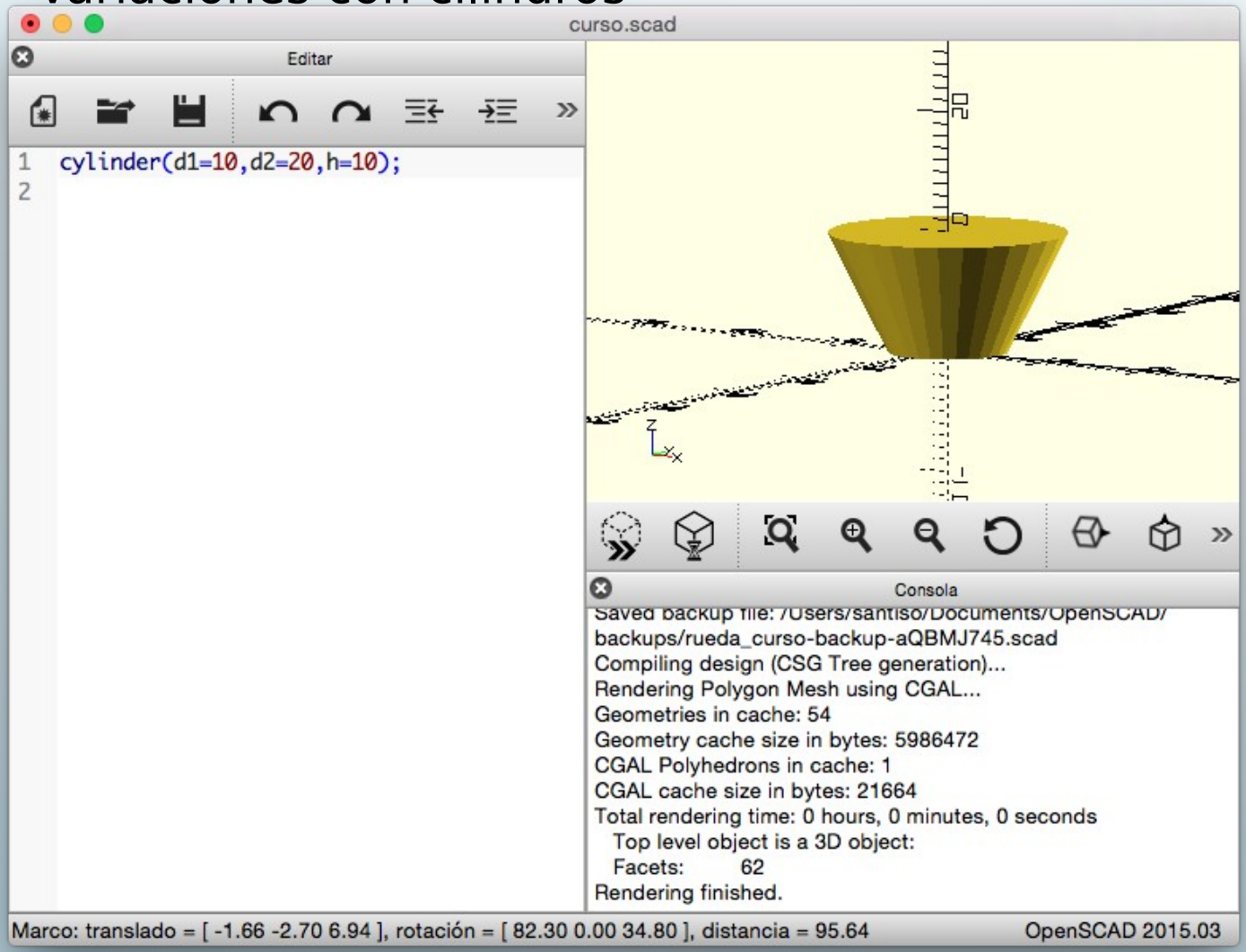
Programación

- Diseño de un cilindro



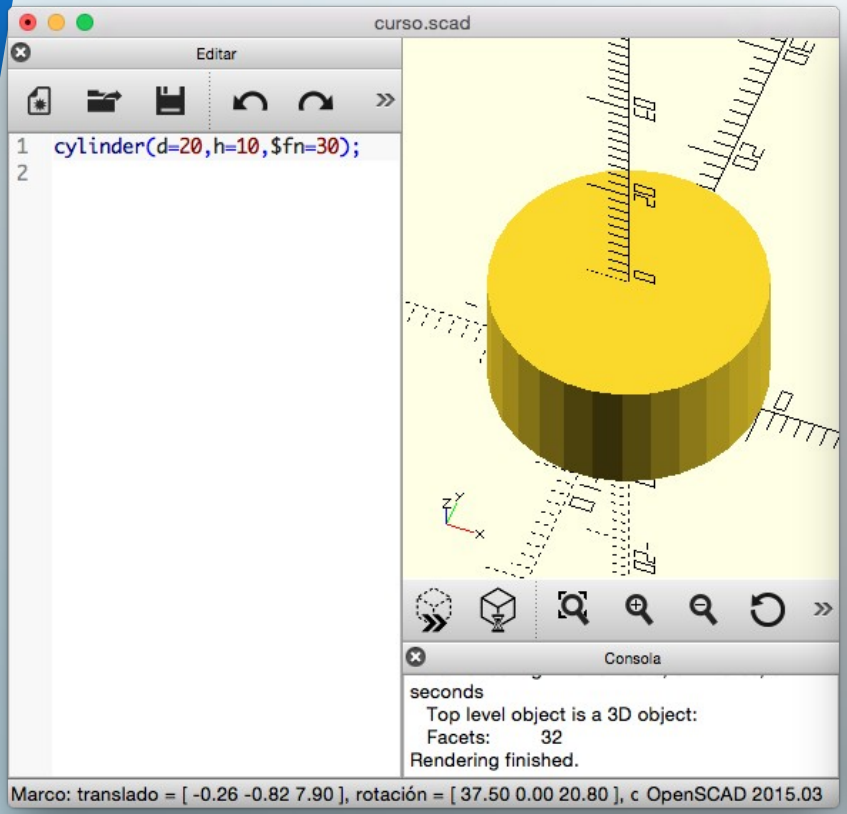
Programación

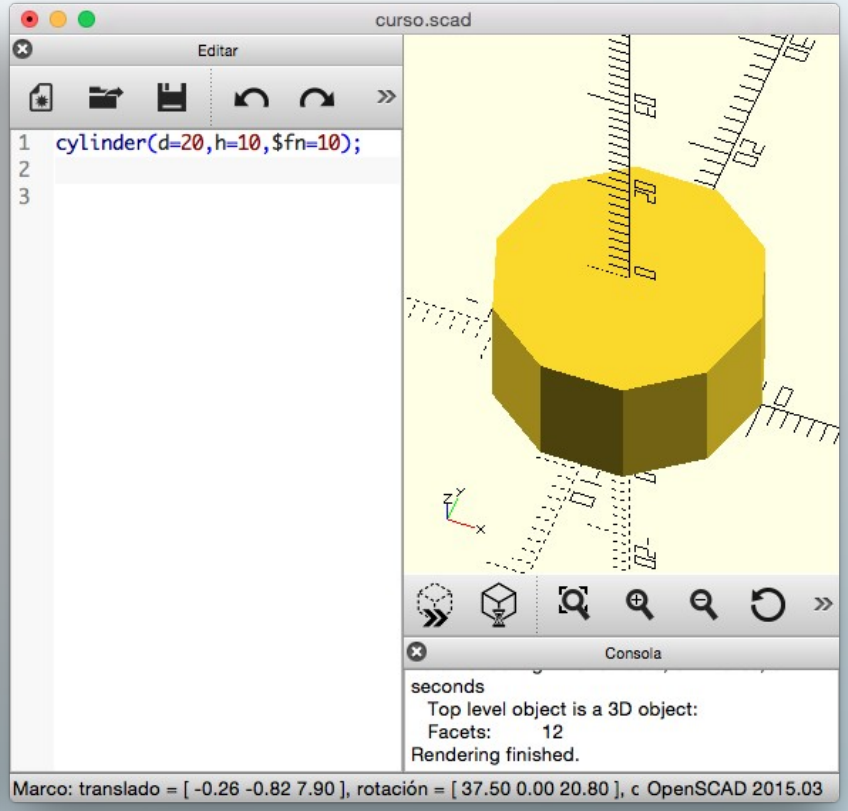
- Variaciones con cilindros



Programación

- Variaciones con cilindros. Resolución $fn.





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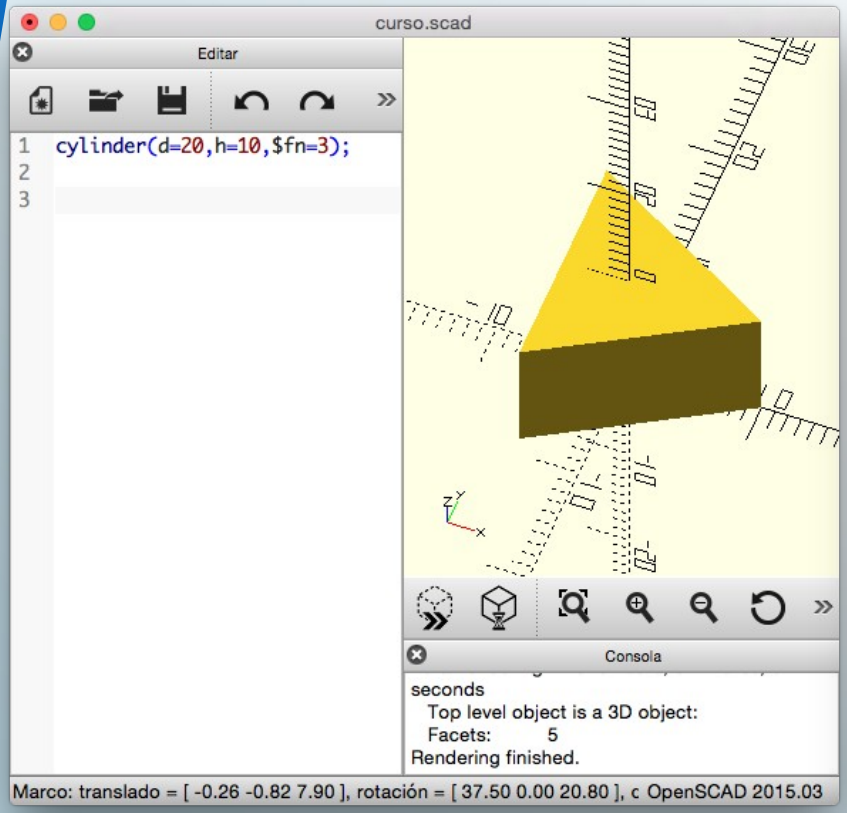
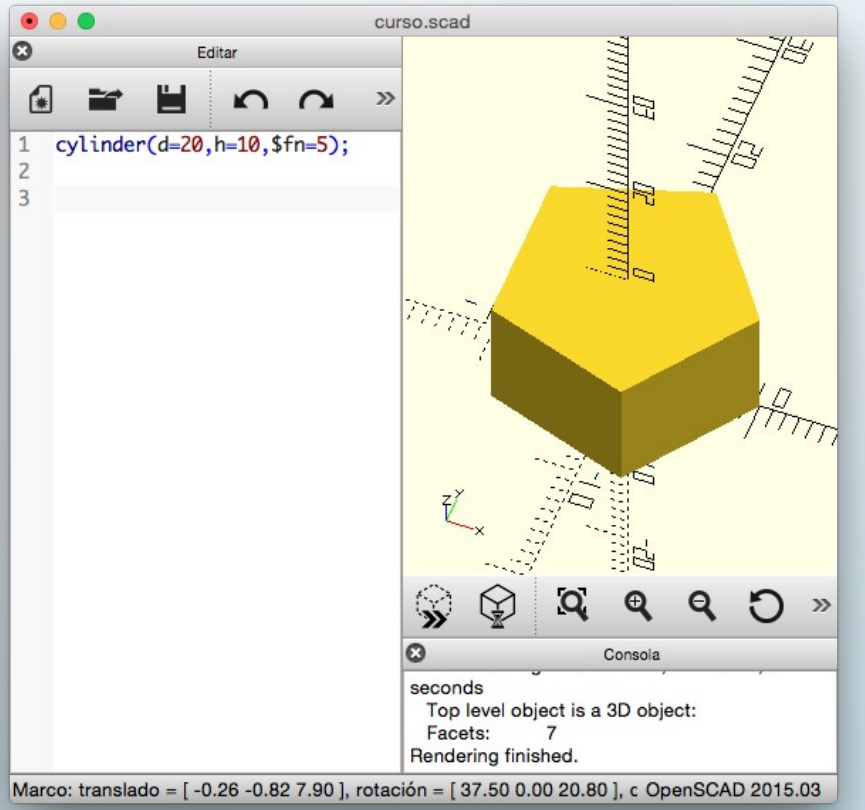
Programación

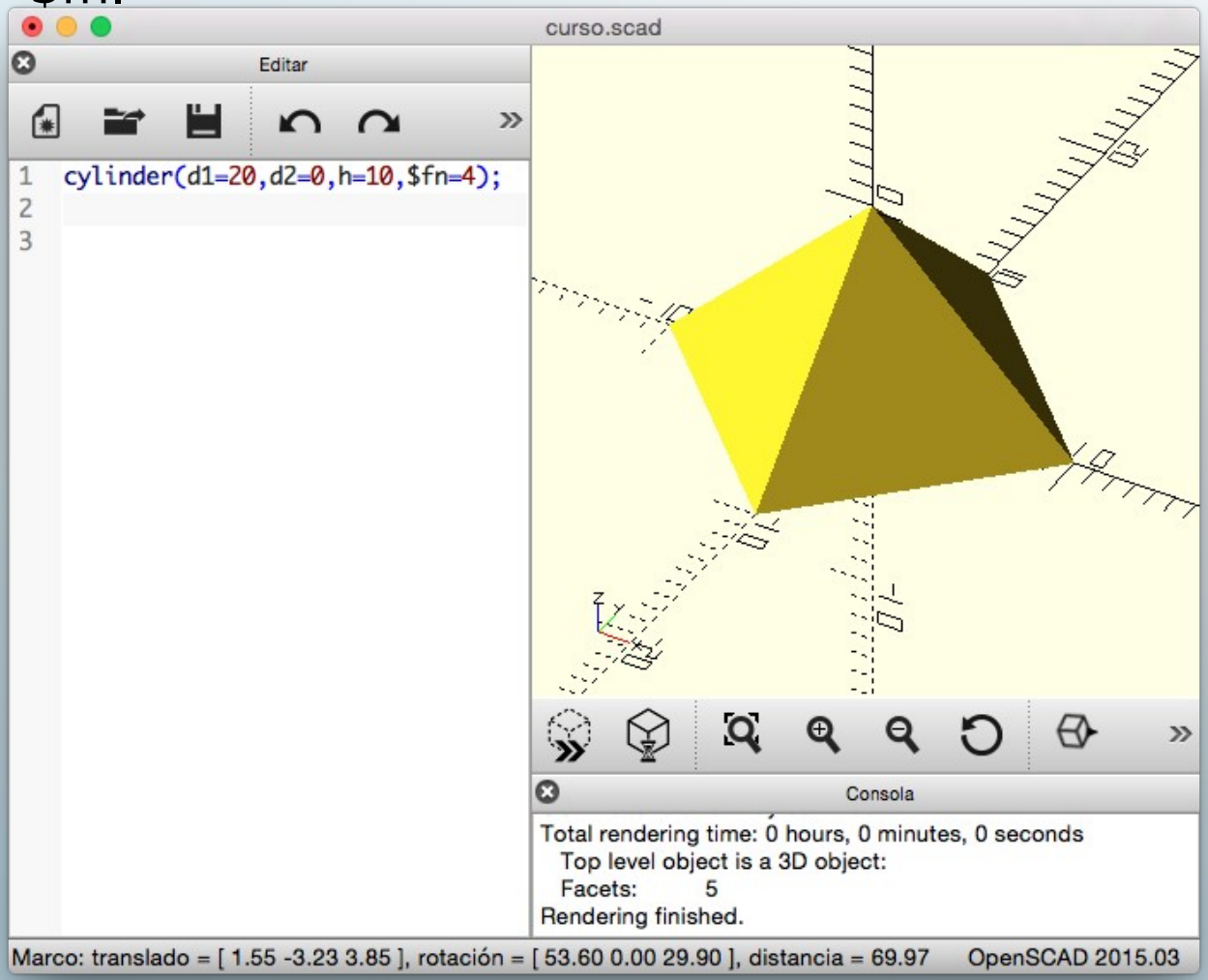
- Variaciones con cilindros. Resolución $fn.





Programación

- Variaciones con cilindros. Resolución $fn.



Programación

- Objetos base

2D

```
circle(radius | d=diameter)
square(size,center)
square([width,height],center)
polygon([points])
polygon([points],[paths])
```

3D

```
sphere(radius | d=diameter)
cube(size)
cube([width,depth,height])
cylinder(h,r|d,center)
cylinder(h,r1|d1,r2|d2,center)
polyhedron(points, triangles, convexity)
```

Programación

- Sintaxis

Syntax

```
var = value;

module name(…) { … }
name();

function name(…) = …
name();

include <….scad>

use <….scad>
```

Programación

- Transformaciones

Transformations

```
translate([x,y,z])
rotate([x,y,z])
scale([x,y,z])
resize([x,y,z],auto)
mirror([x,y,z])
multmatrix(m)
color("colorname")
color([r, g, b, a])
hull()
minkowski()
```

Programación

- Operadores booleanos

Boolean operations

```
union()
difference()
intersection()
```

- Variables especiales

Special variables

```
$fa minimum angle
$fs minimum size
$fn number of fragments
$t  animation step
```

Programación

- Otros

Other

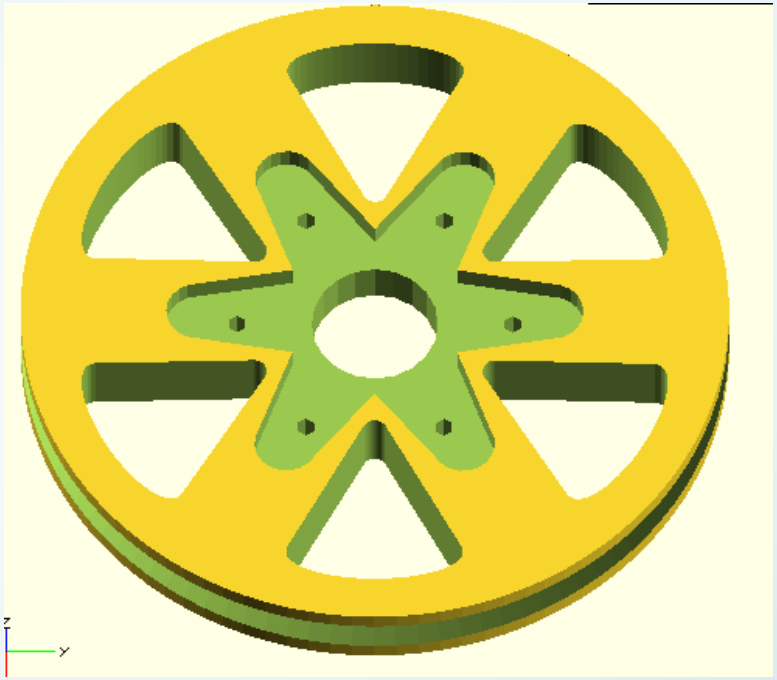
```
echo(…)
for (i = [start:end]) { … }
for (i = [start:step:end]) { … }
for (i = […,…,…]) { … }
intersection_for(i = [start:end]) { … }
intersection_for(i = [start:step:end]) { … }
intersection_for(i = […,…,…]) { … }
if (…) { … }
assign (…) { … }
import("….stl")
linear_extrude(height,center,convexity,twist,slices)
rotate_extrude(convexity)
surface(file = "….dat",center,convexity)
projection(cut)
render(convexity)
children([idx])
```

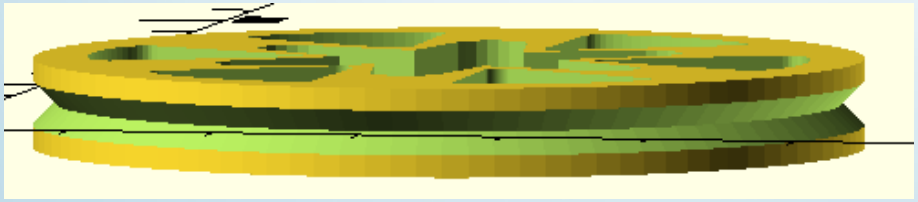
Mathematical

```
abs
sign
sin
cos
tan
acos
asin
atan
atan2
floor
round
ceil
ln
len
log
pow
sqrt
exp
rands
min
max
```

Programación

- Ejercicios
  - Rueda del robot





Ejemplos

- Rueda del robot
  - Maciza
  - Surco triangular
  - Surco circular
  - Adaptador servo
  - Radios
  - Parametrizar