

# OpenSCAD

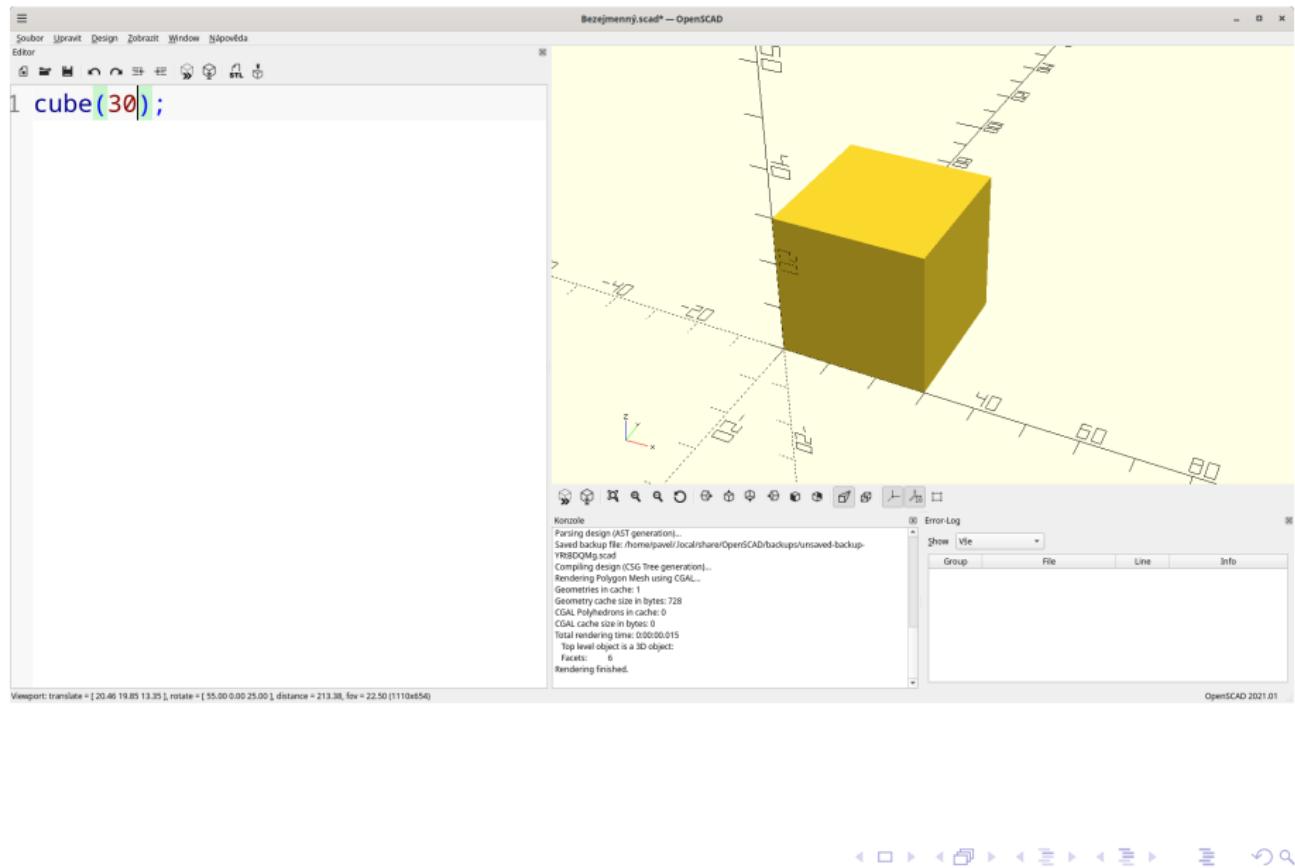
- <https://openscad.org>
- různé operační systémy
- zdrojový kód
- manuály
- knihovny
- příklady
- jednoduché ovládání
- videa s návody

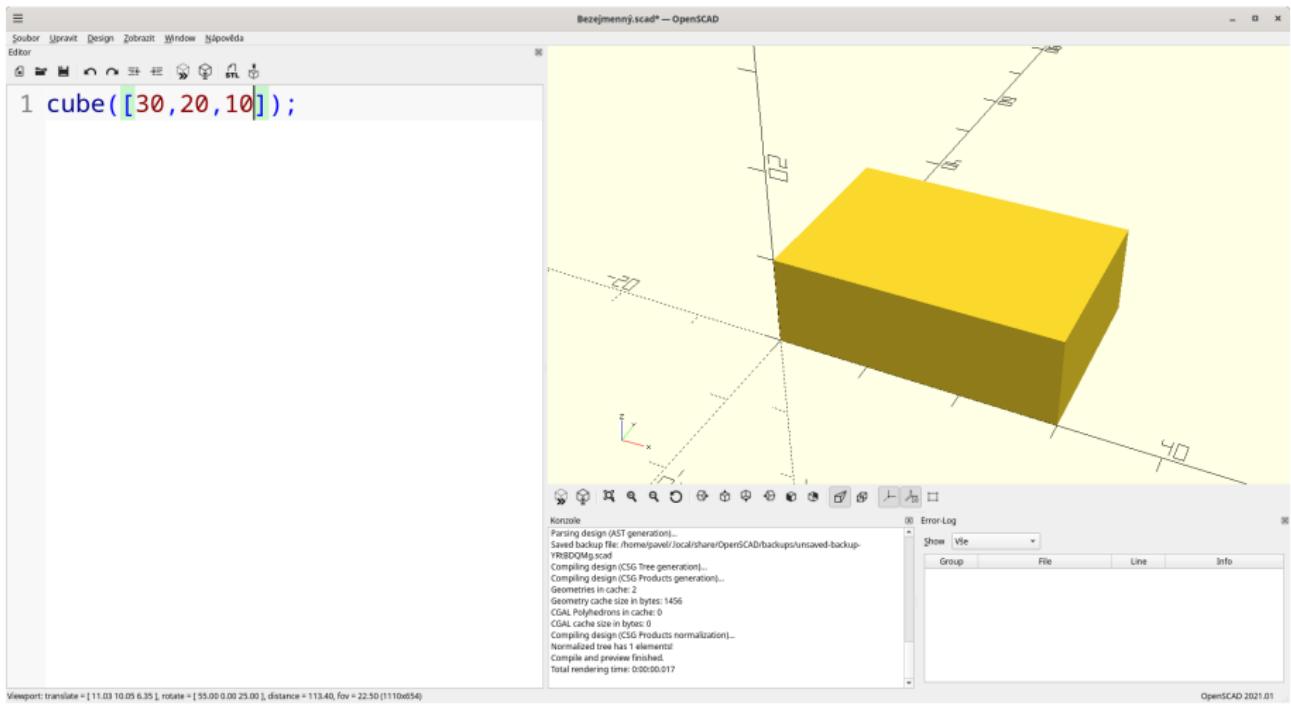
# Ovládání

- F5 - rychlý náhled
- F6 - renderování
- F7 - export 3D modelu do formátu STL
- menu

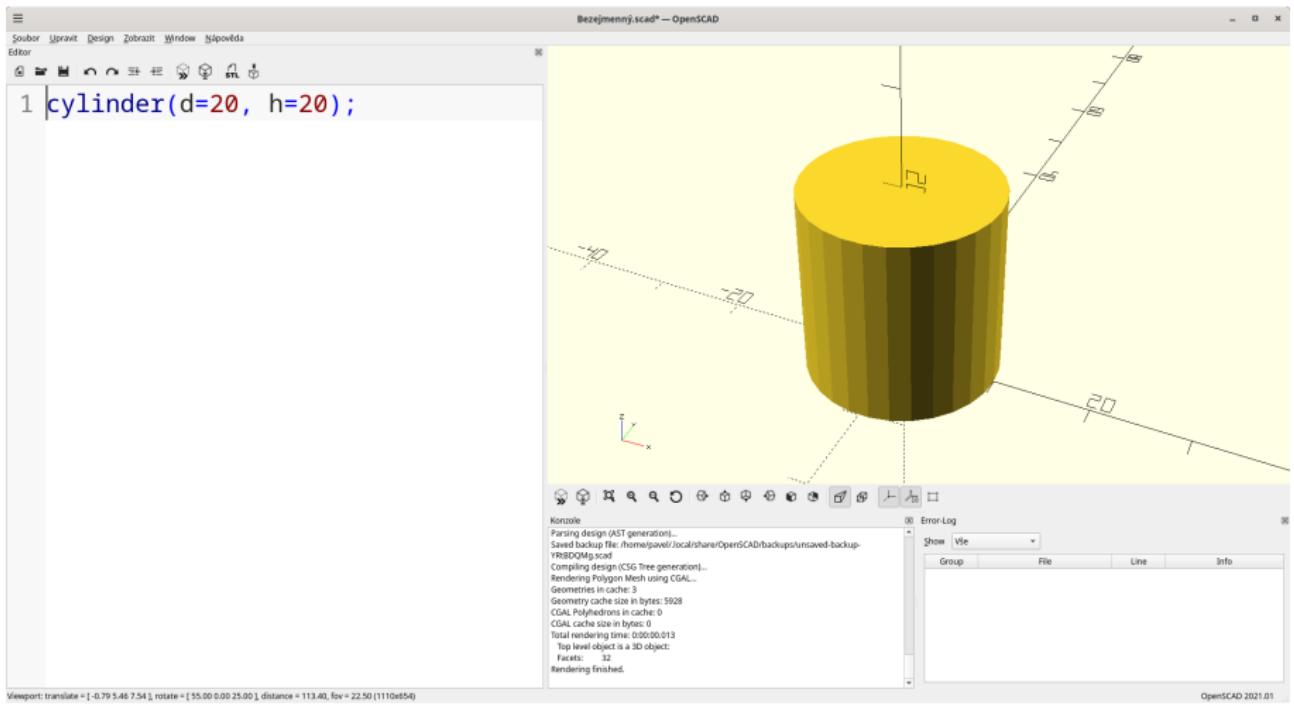
# Příkazy

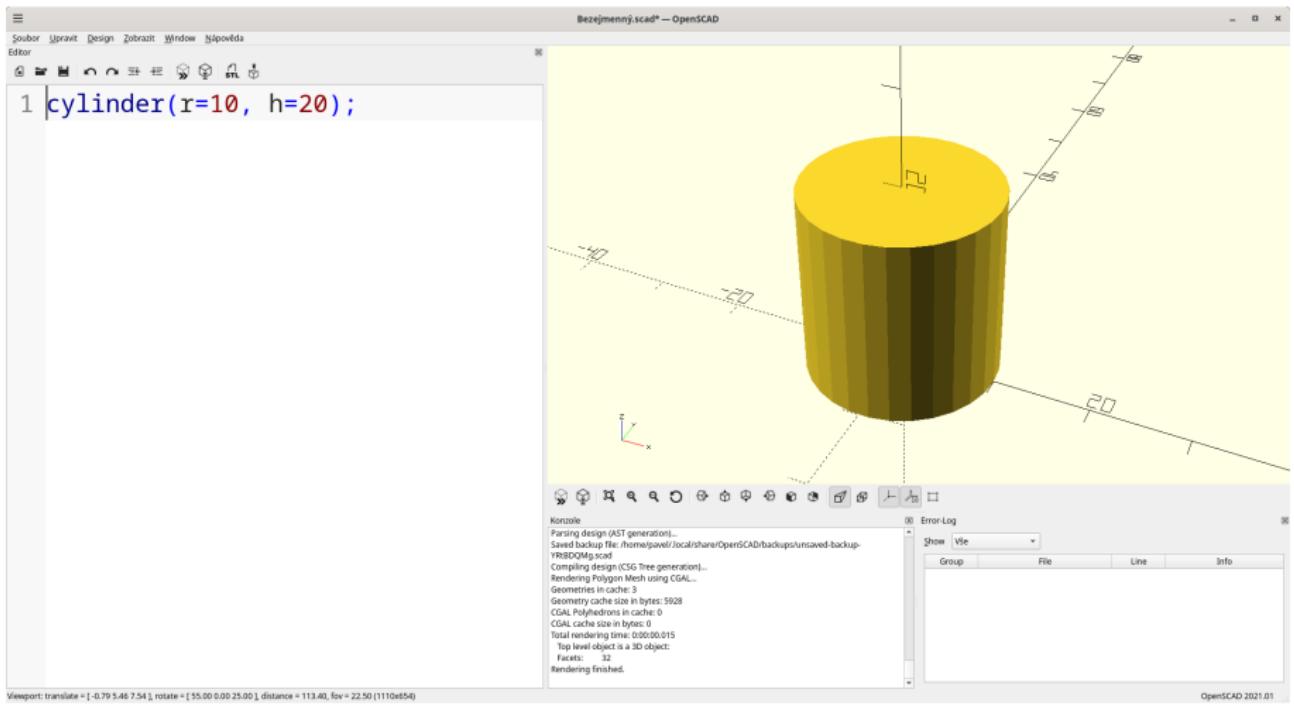
- `cube(30);`
- `cube([30,20,10]);`

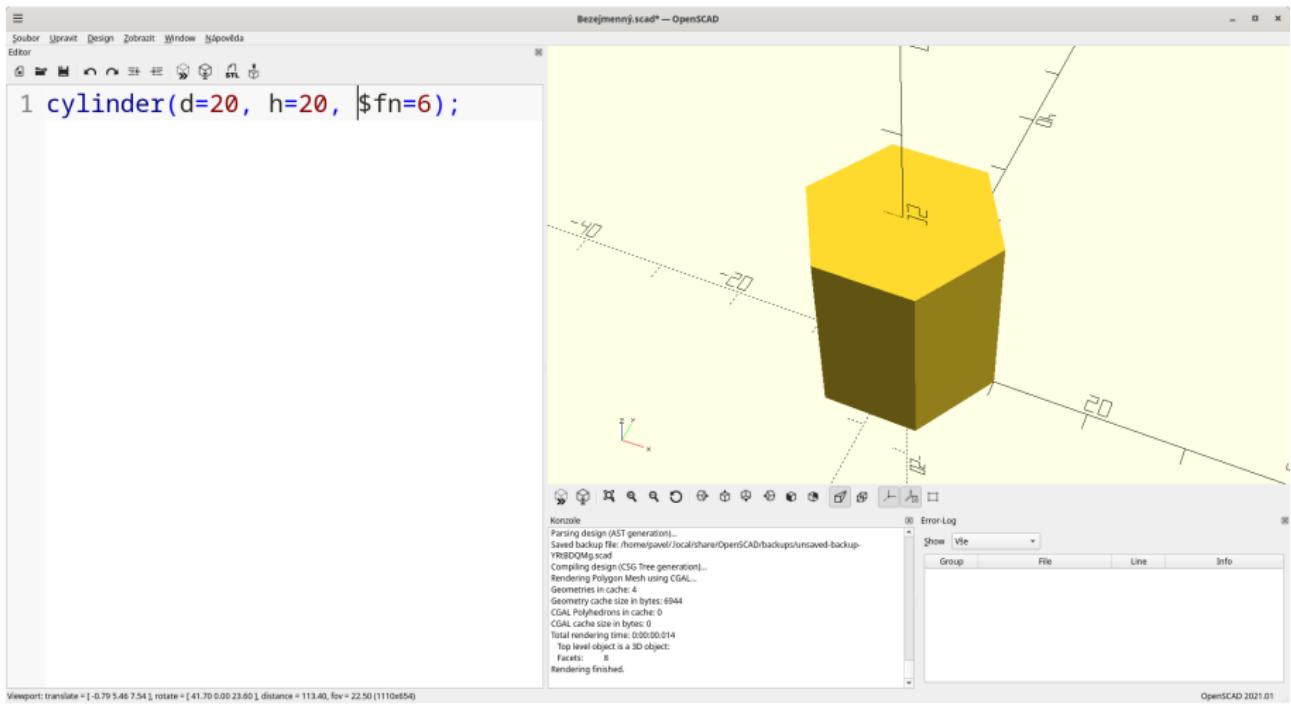


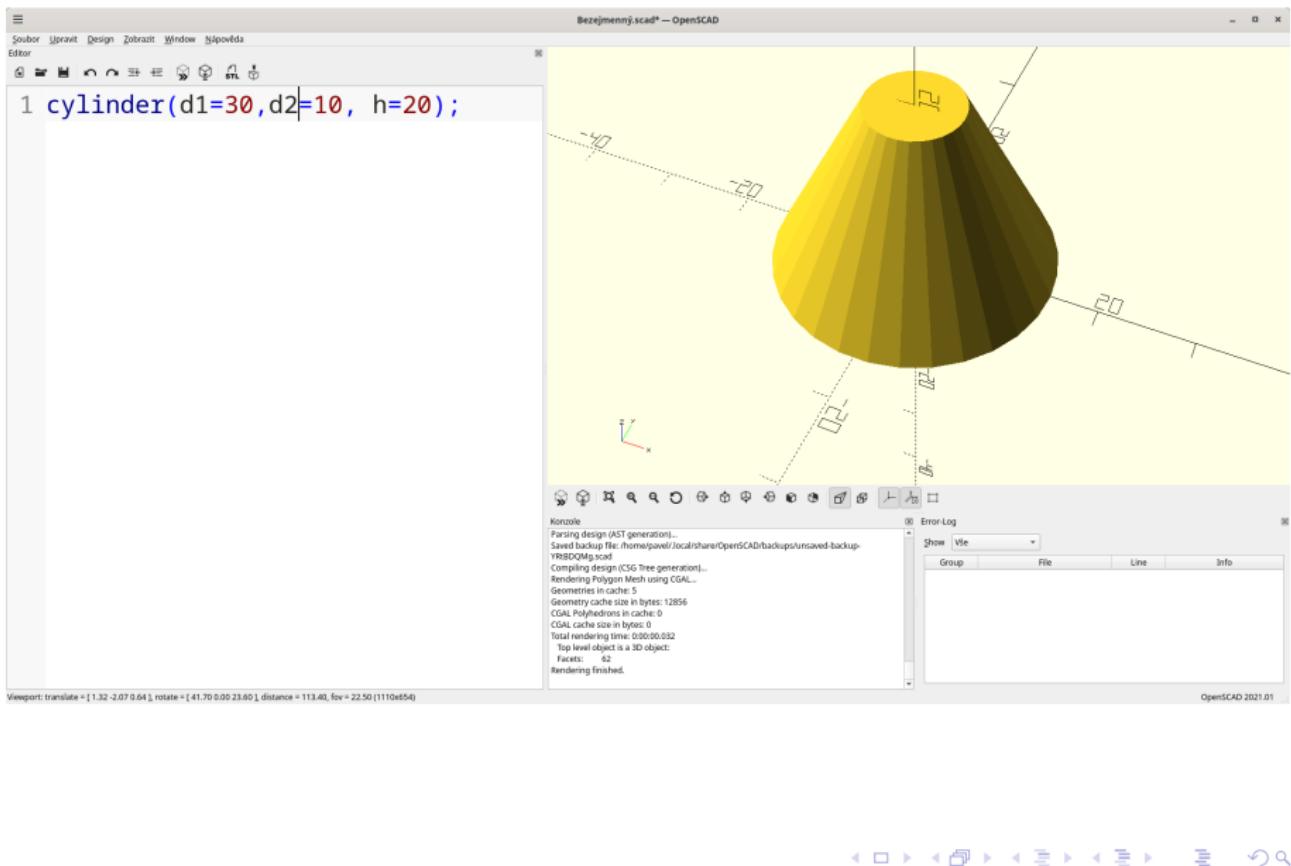


- cylinder( $d=20, h=20$ );
- cylinder( $r=10, h=20$ );
- cylinder( $d=20, h=20, \text{$fn}=6$ );
- cylinder( $d1=30, d2=10, h=20$ );

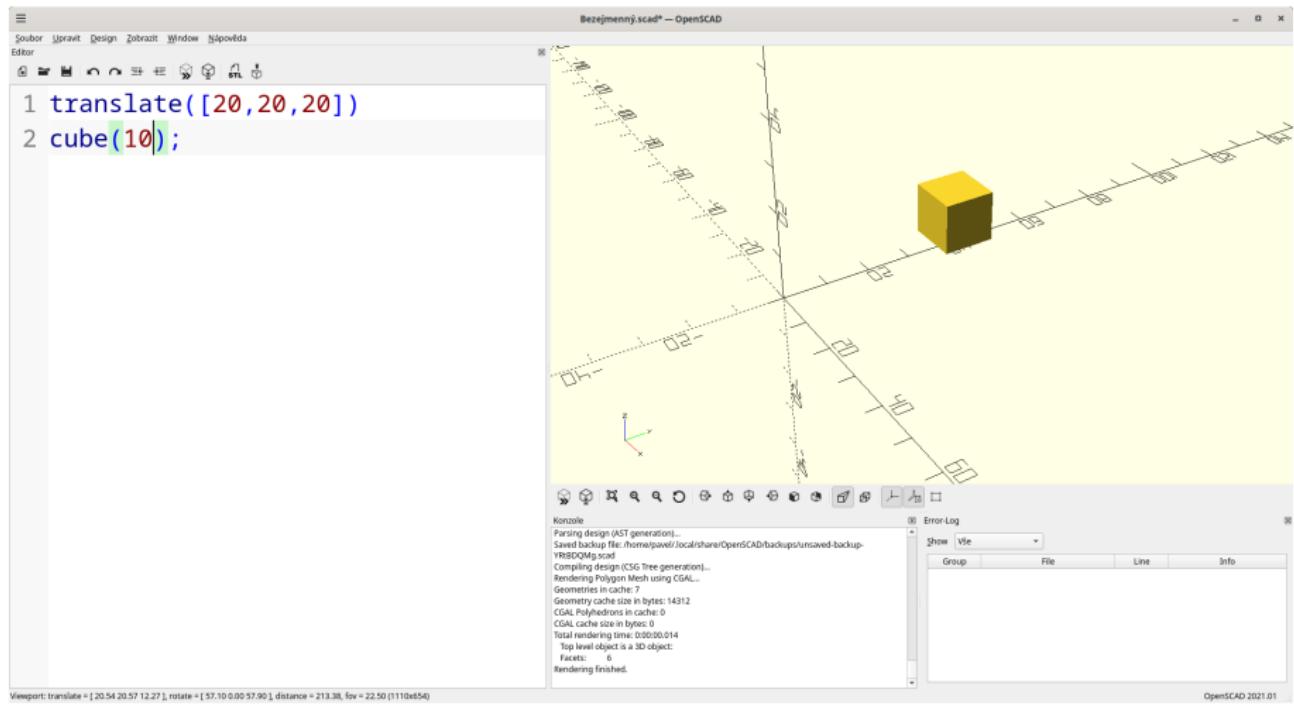


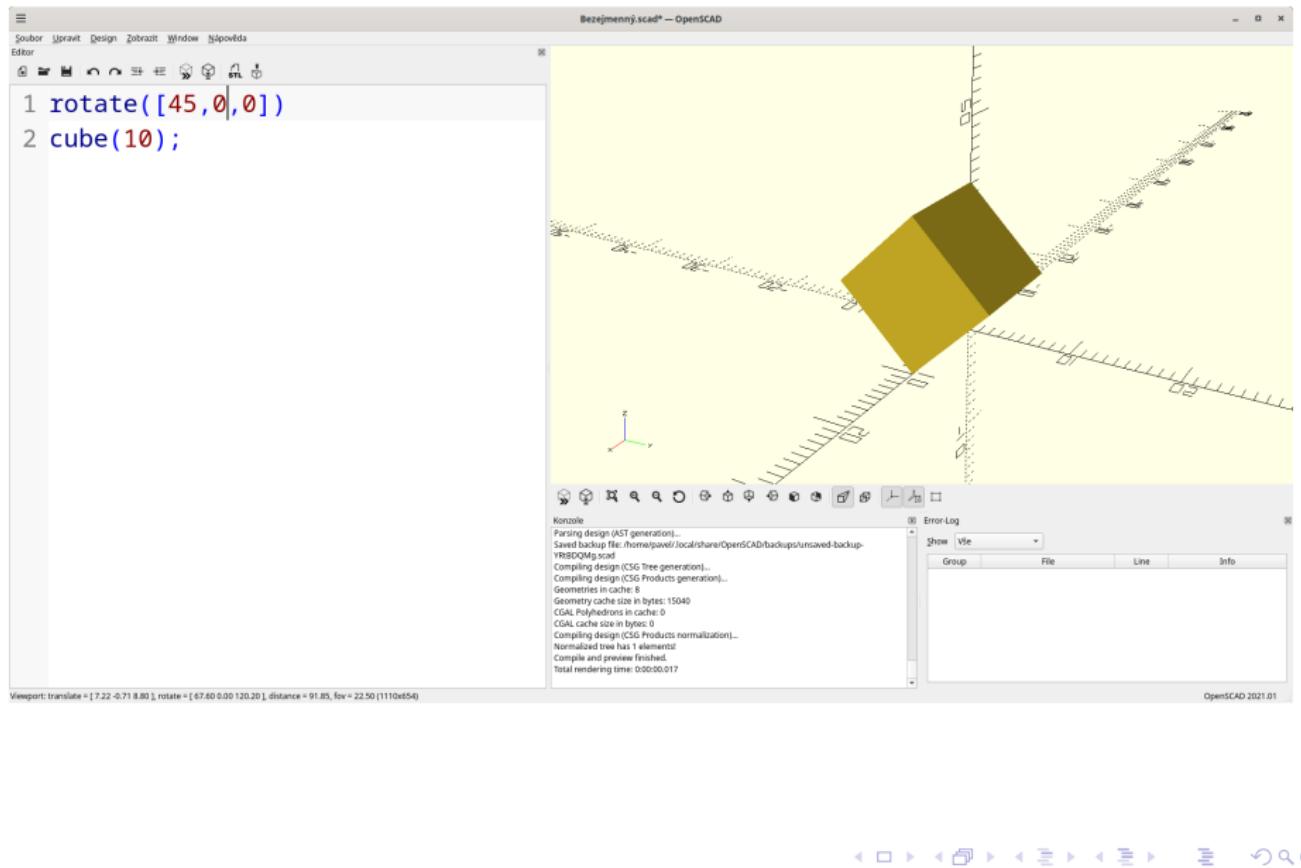




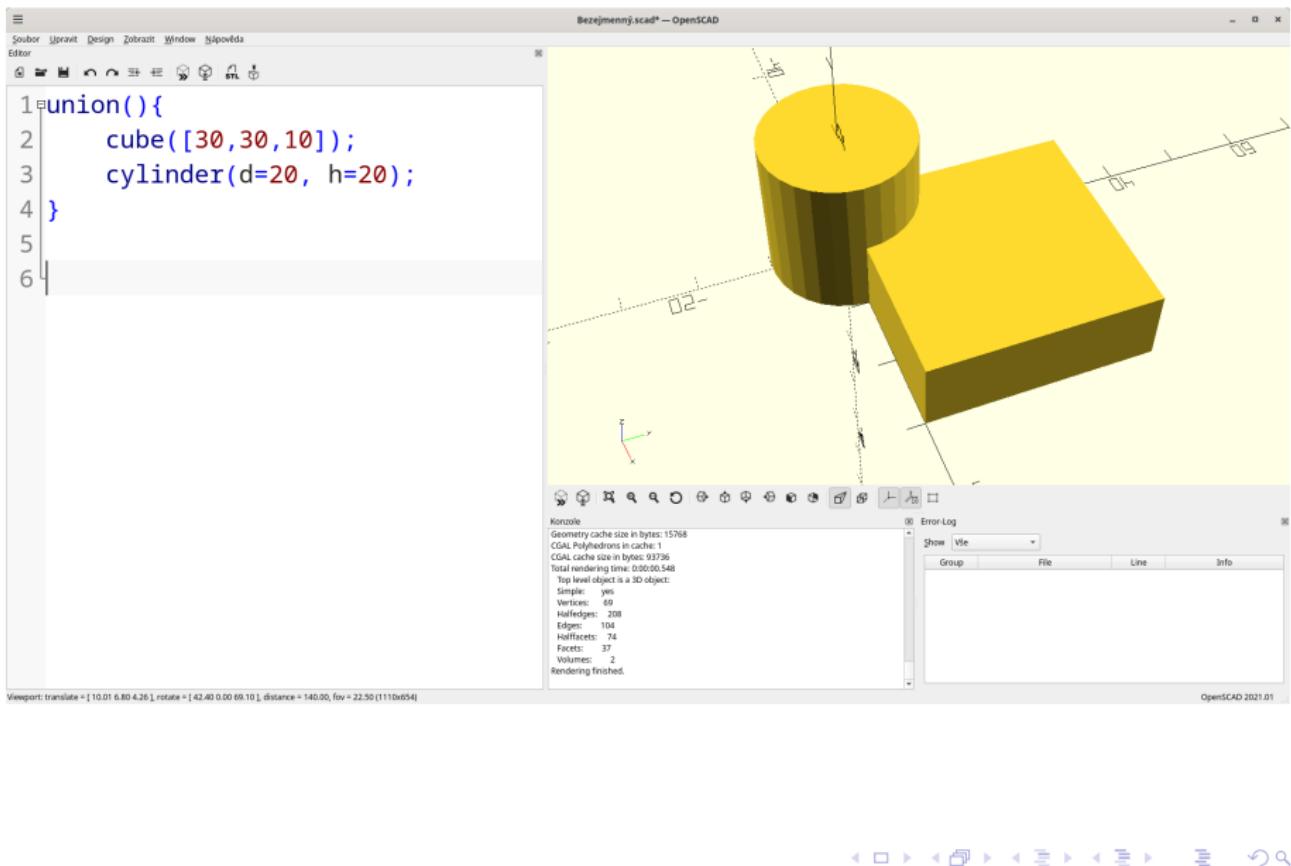


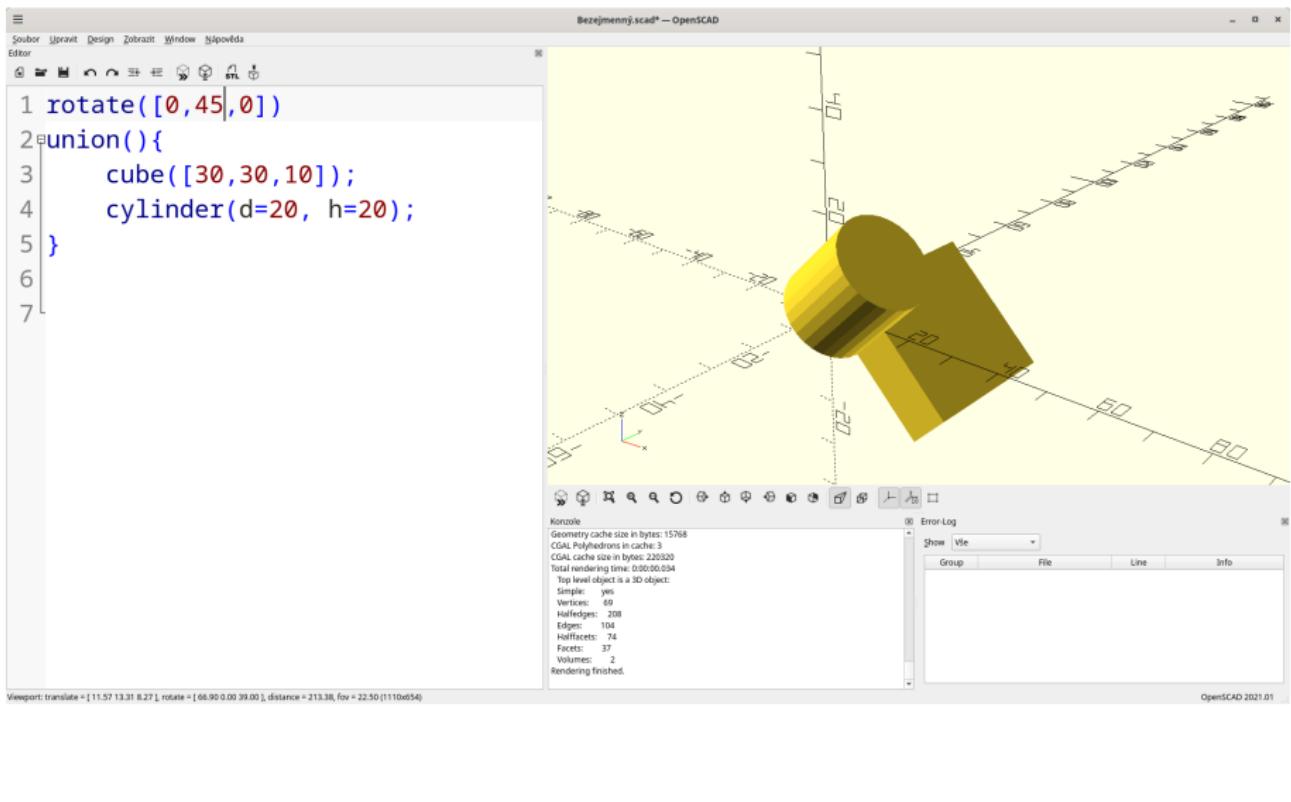
- translate([20,20,20])
- rotate([45,0,0])





- union()...
- difference()...





Soubor Upravit Design Zobrazit Window Nápověda  
Editor

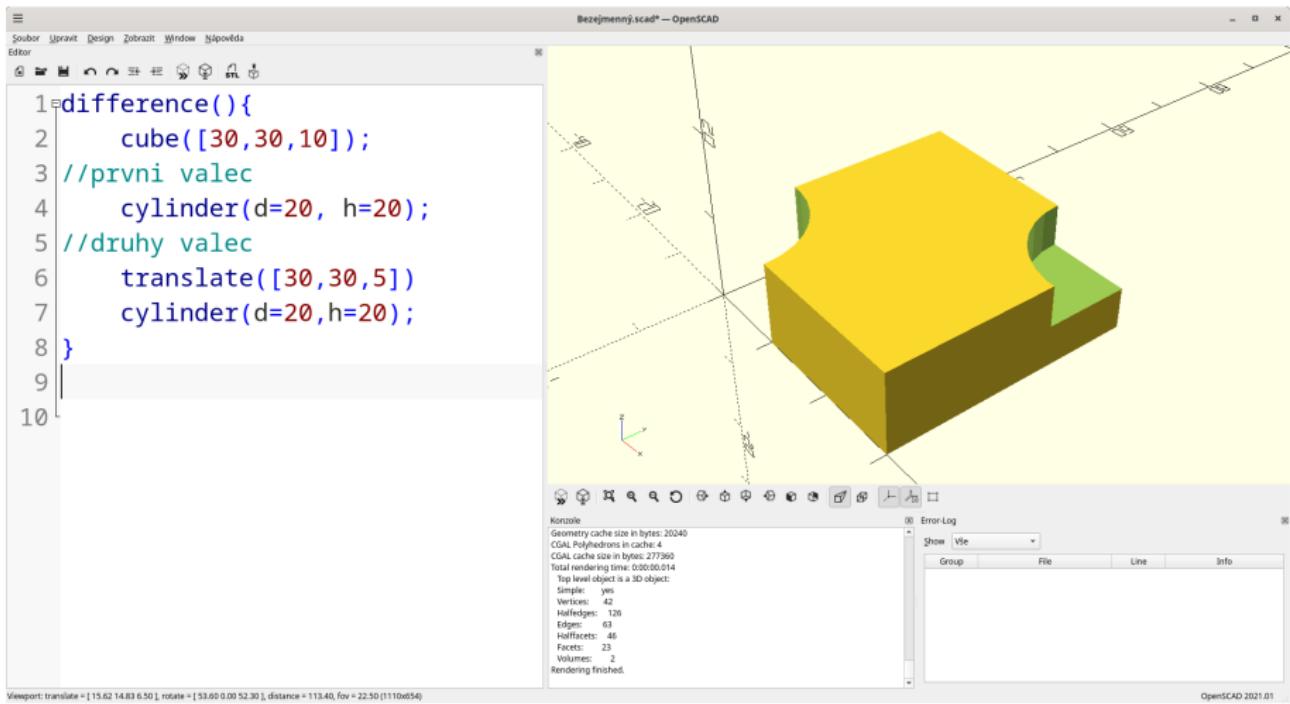
```
Bezejmenný scad — OpenSCAD
1 difference(){
2     cube([30,30,10]);
3     cylinder(d=20, h=20);
4 }
5
6
```

Konsole

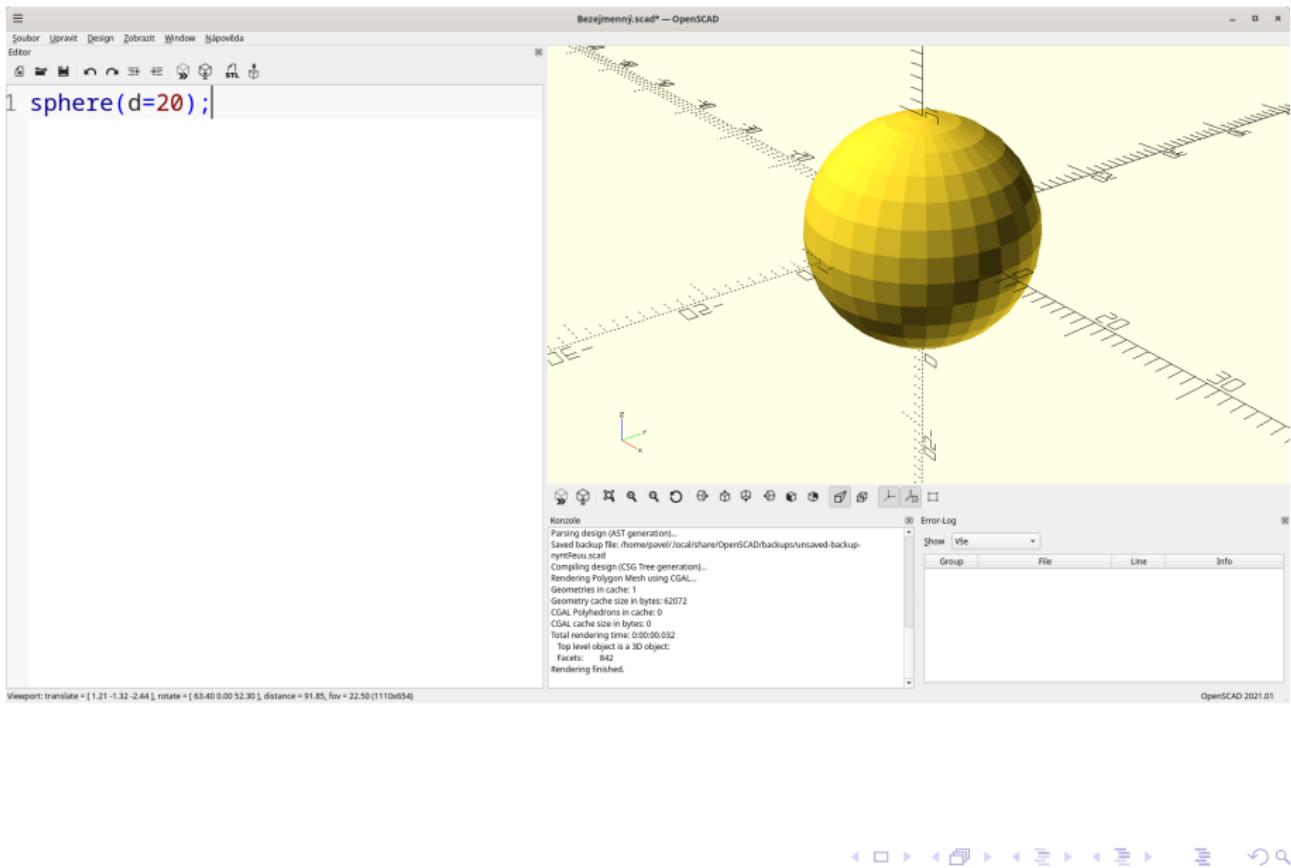
Geometry cache size in bytes: 15768  
CGAL Polyhedrons in cache: 2  
CGAL Cache size in bytes: 126584  
Total rendering time: 0:00:00.085  
Top level object is a 3D object:  
Simple  
Vertices: 24  
Halfedges: 72  
Edges: 36  
Halfedges: 28  
Faces: 14  
Volumes: 2  
Rendering finished.

Viewport: translate = [10.01 6.80 4.26] rotate = [41.00 0.00 32.70], distance = 140.00, fov = 22.50 (1110x654)

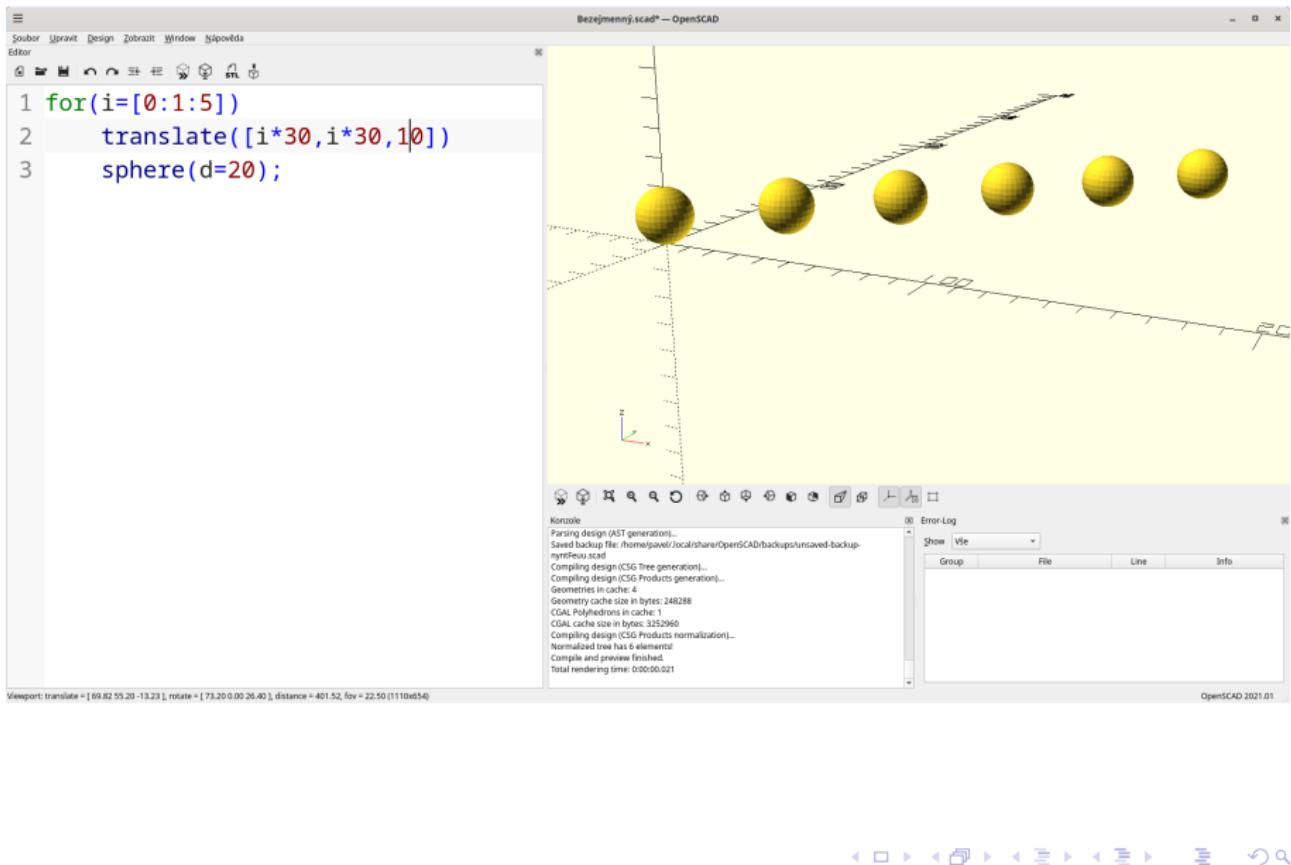
OpenSCAD 2021.01



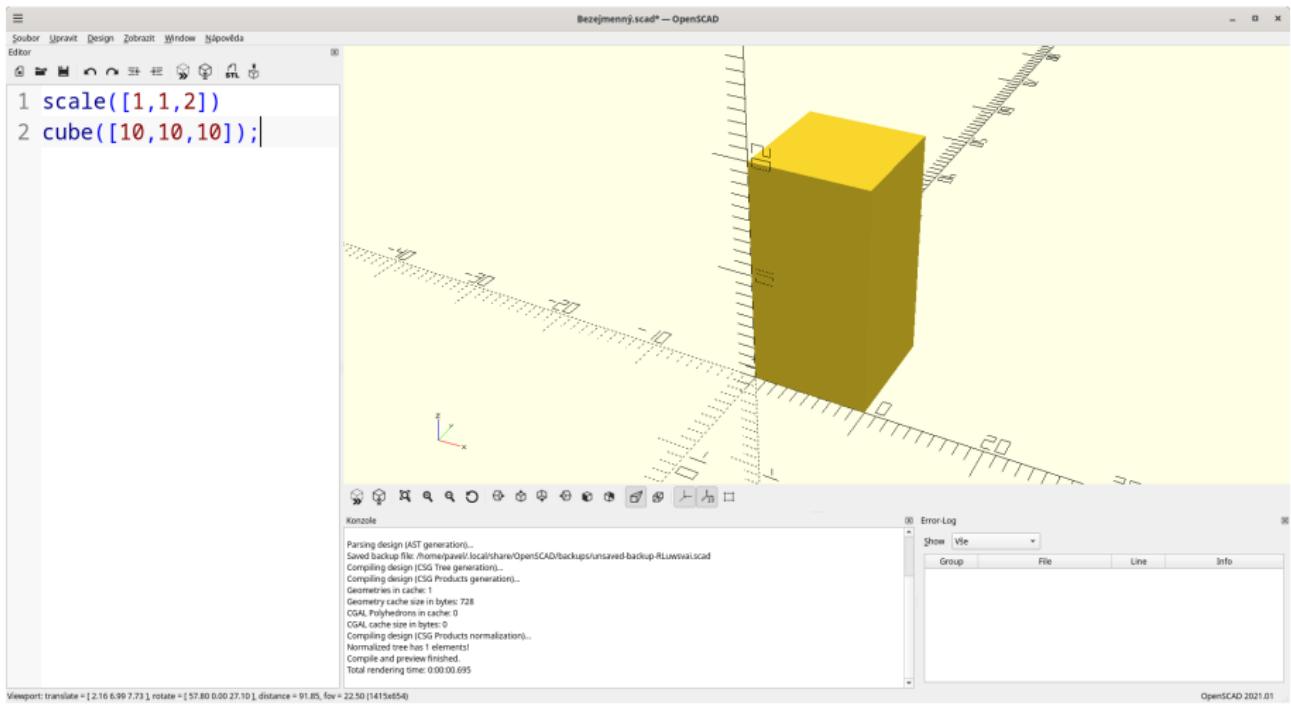
- `sphere(d=20);`

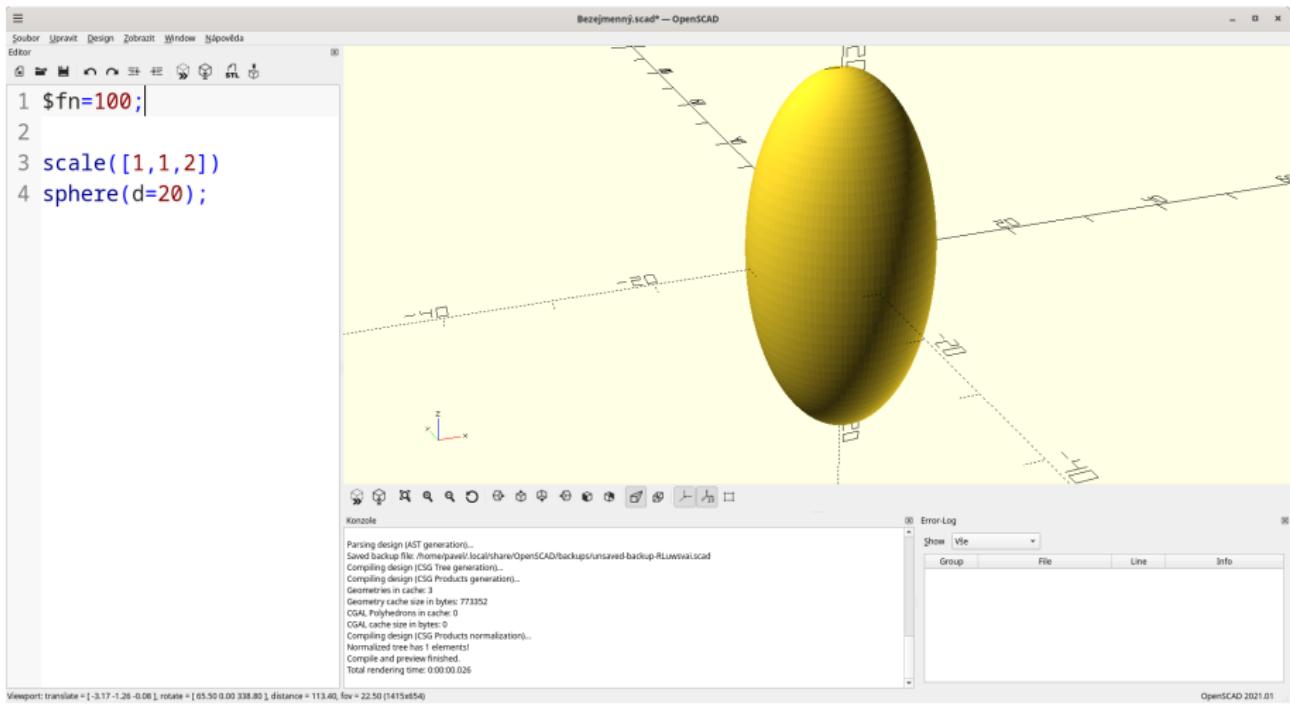


- `for(i=[0:1:5]) ...;`



- `scale([x,y,z])`





- module test() {...}

Soubor Upravit Design Zobrazit Window Nápověda

Bezejmenný scad — OpenSCAD

Editor

```
1 $fn=100;
2 
3 test();
4 
5 translate([30,0,0]) 
6   test();
7 module test(){
8 
9   cube([10,10,20]);
10 }
```

Konzole

```
Parsing design (AST generation)...
Saved backup file: /home/pavel/.local/share/OpenSCAD/backups/unsaved-backup-Rkuuvscad
Compiling design (CGAL Tree generation)...
Compiling design (CGAL Polyhedron Products generation)...
Geometries in cache: 4
Geometry cache size in bytes: 774080
CGAL Polyhedrons in cache: 0
CGAL cache size in bytes: 0
Compiling design (CGAL Polyhedron Products normalization)...
Normalizing now 2 elements
Compile and preview finished.
Total rendering time: 0:00:00.041
```

Viewport: translate = [19.52 -3.26 13.83], rotate = [65.50 0.00 338.80], distance = 113.40, fov = 22.50 (14296d54)

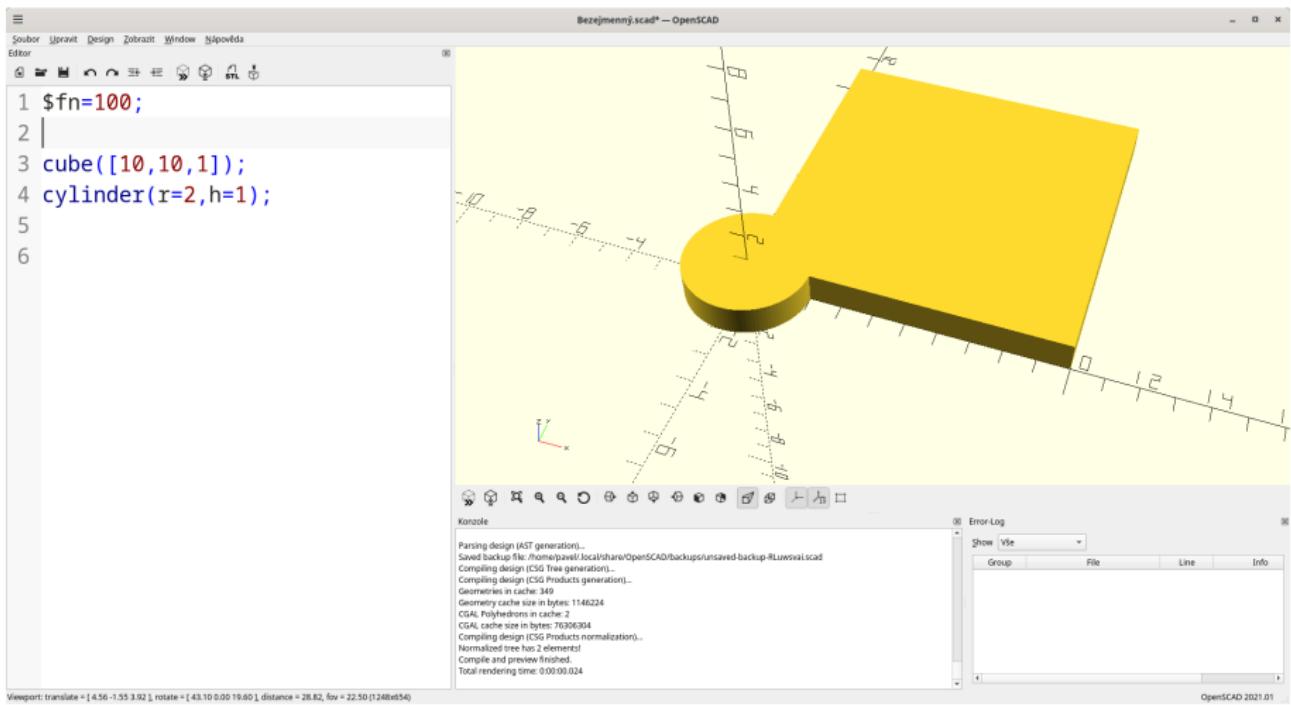
Error Log

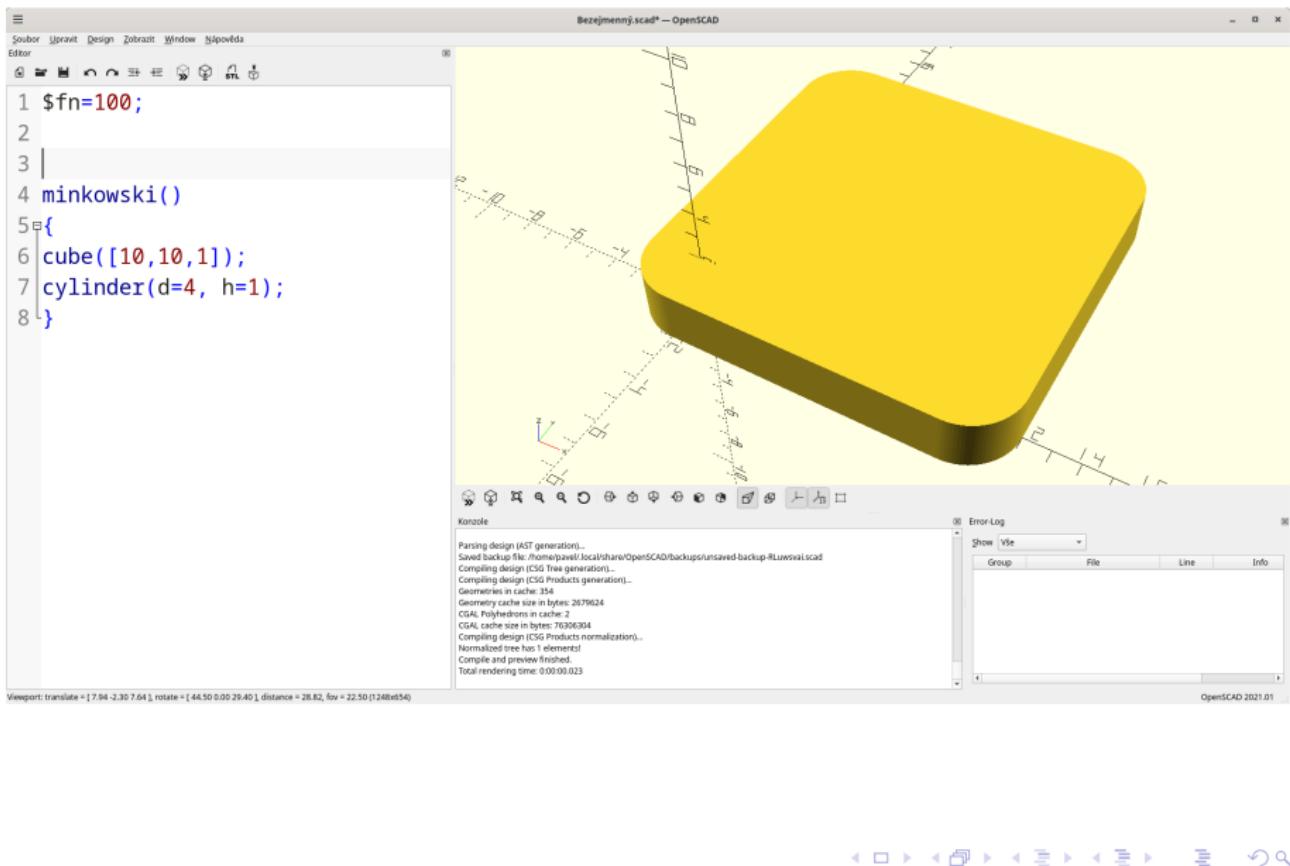
Show Use

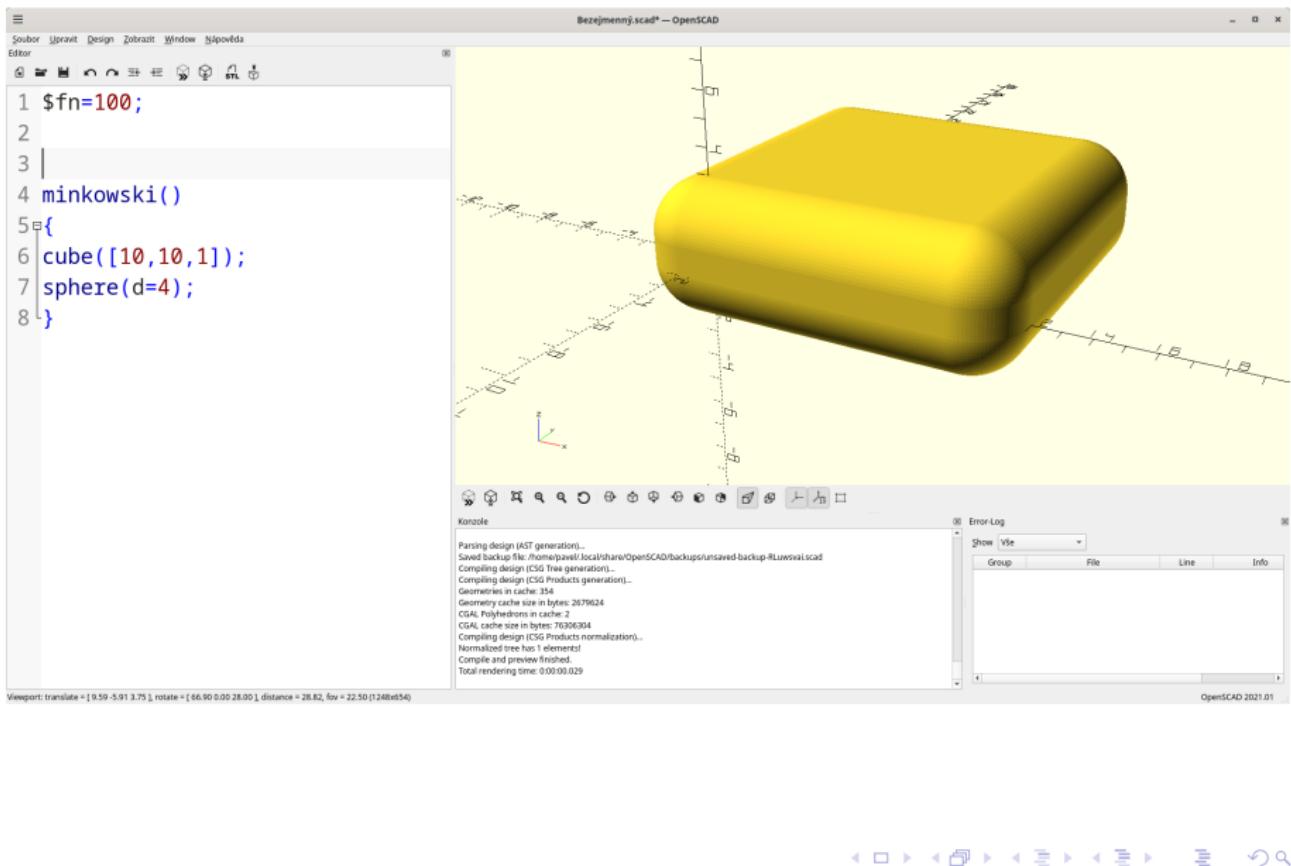
Group File Line Info

OpenSCAD 2021.01

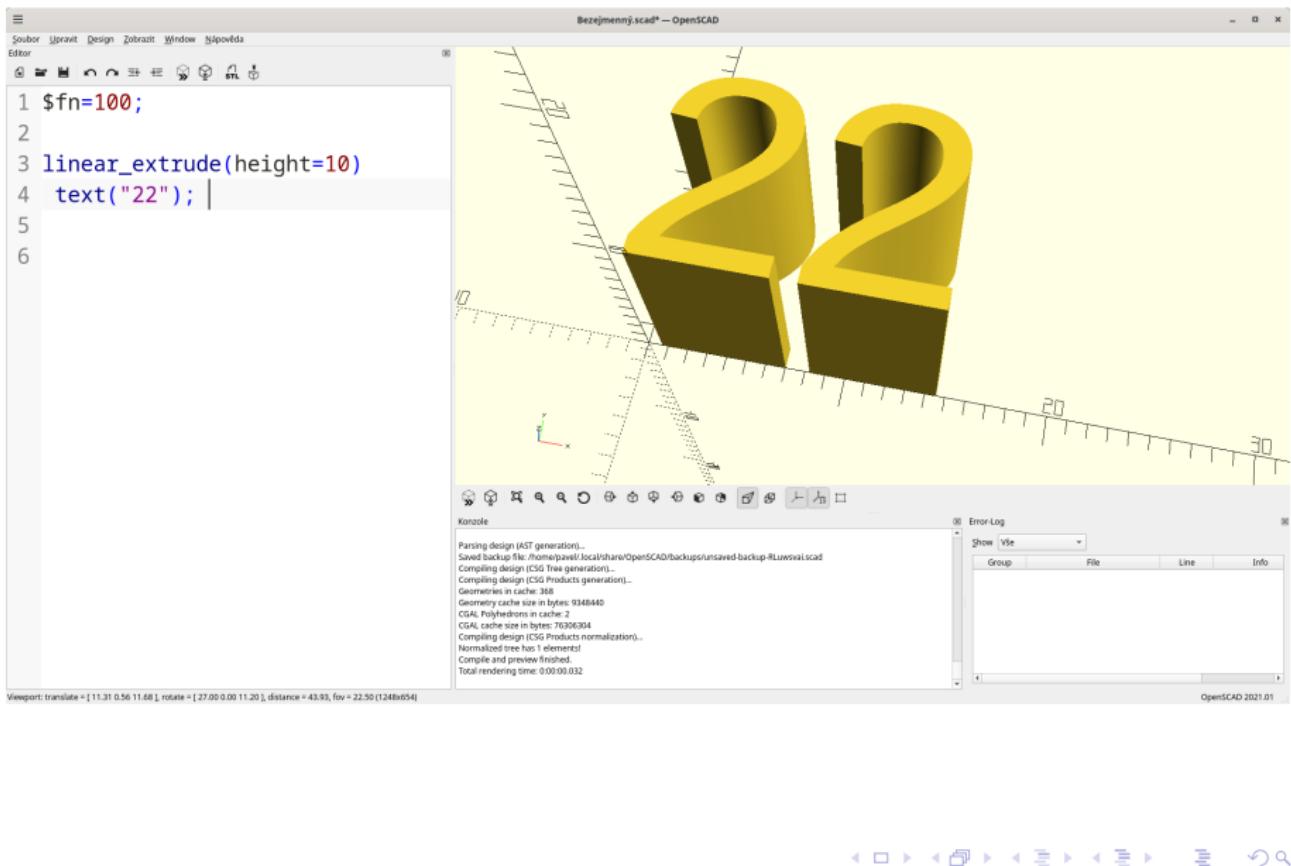
- minkowski() { ... cylinder(d=4, h=1); }
- minkowski() { ... sphere(d=4); }

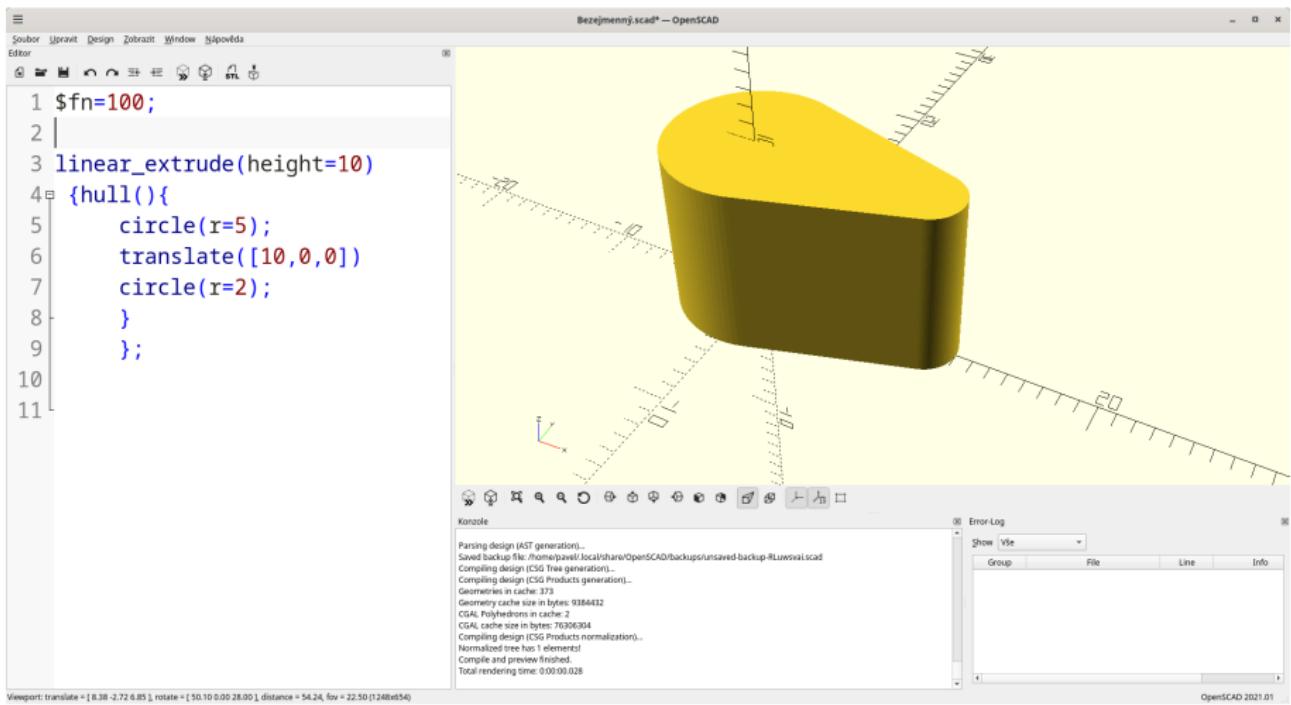




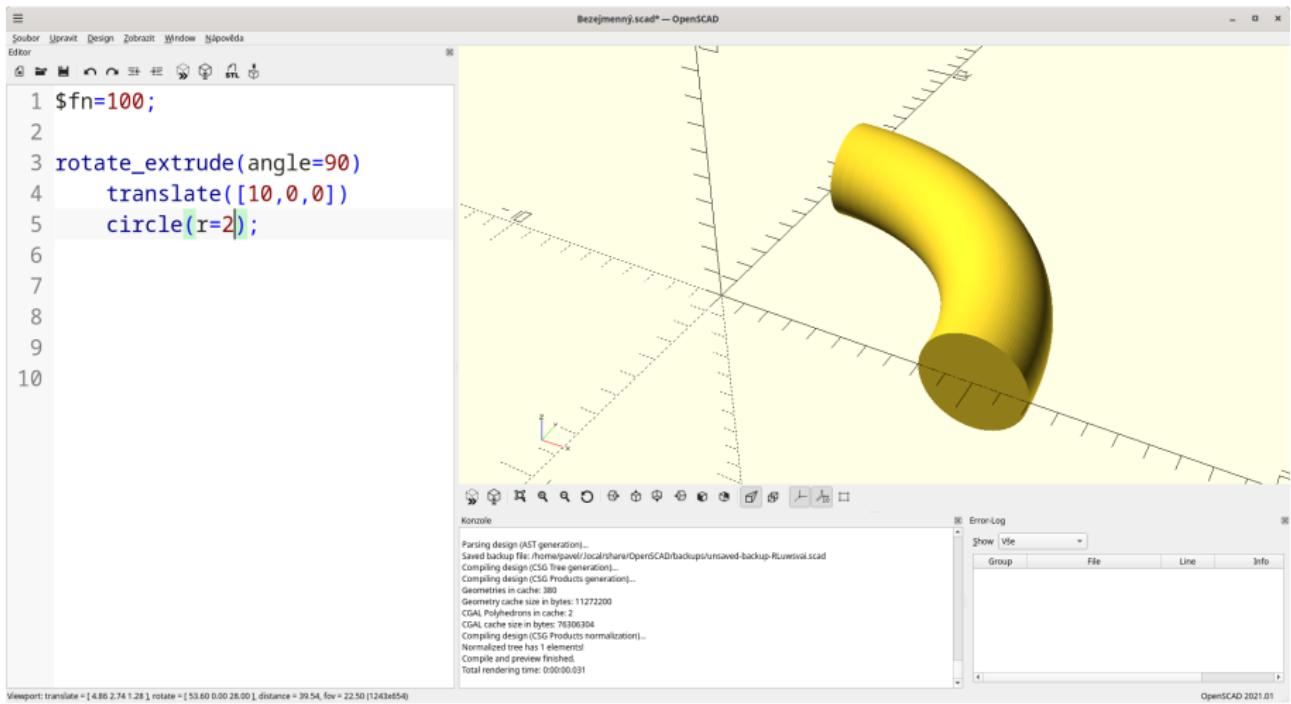


- linear\_extrude(height=10)() { ... }

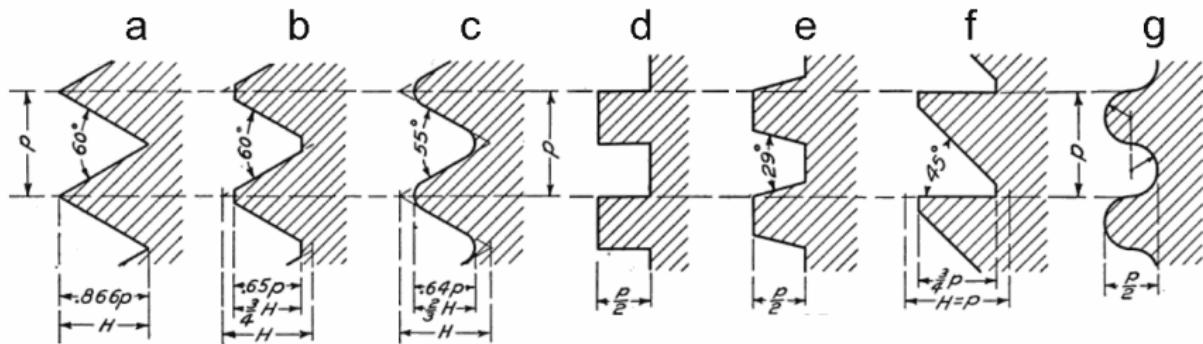




Viewport: translate = [ 8.38 -2.72 6.85 ] rotate = [ 50.10 0.00 28.00 ] distance = 54.24, fov = 22.50 (1248x654)



# Závity



- a) V-thread, b) American National thread, c) Whitworth, d) Square thread,  
e) Acme thread, f) Buttress thread, g) Knuckle thread; Edison thread

Wikimedia

Soubor Upravit Design Zobrazit Window Nápověda

Bezejmenný scad — OpenSCAD

Editor

```
1 $fn=100;
2
3 include<threads.scad>;
4
5 // G 1/4
6 english_thread (diameter=0.518,
    threads_per_inch=19, length=1);
7
8
```

3D Viewport showing a yellow cylinder with a stack of smaller cylinders on top, representing a threaded bolt. The model is centered in a coordinate system with a red X-axis, green Y-axis, and blue Z-axis.

Konsole

```
Geometry cache size in bytes: 1130944
CGAL Polyhedrons in cache: 2
CGAL cache size in bytes: 76306394
Total rendering time: 0.0156.100
Top level object is a 3D object:
Solidify: yes
Vertices: 27476
Halfedges: 85430
Edges: 42715
Halfedges: 30482
Faces: 15241
Volumes: 2
Rendering finished.
```

Error Log

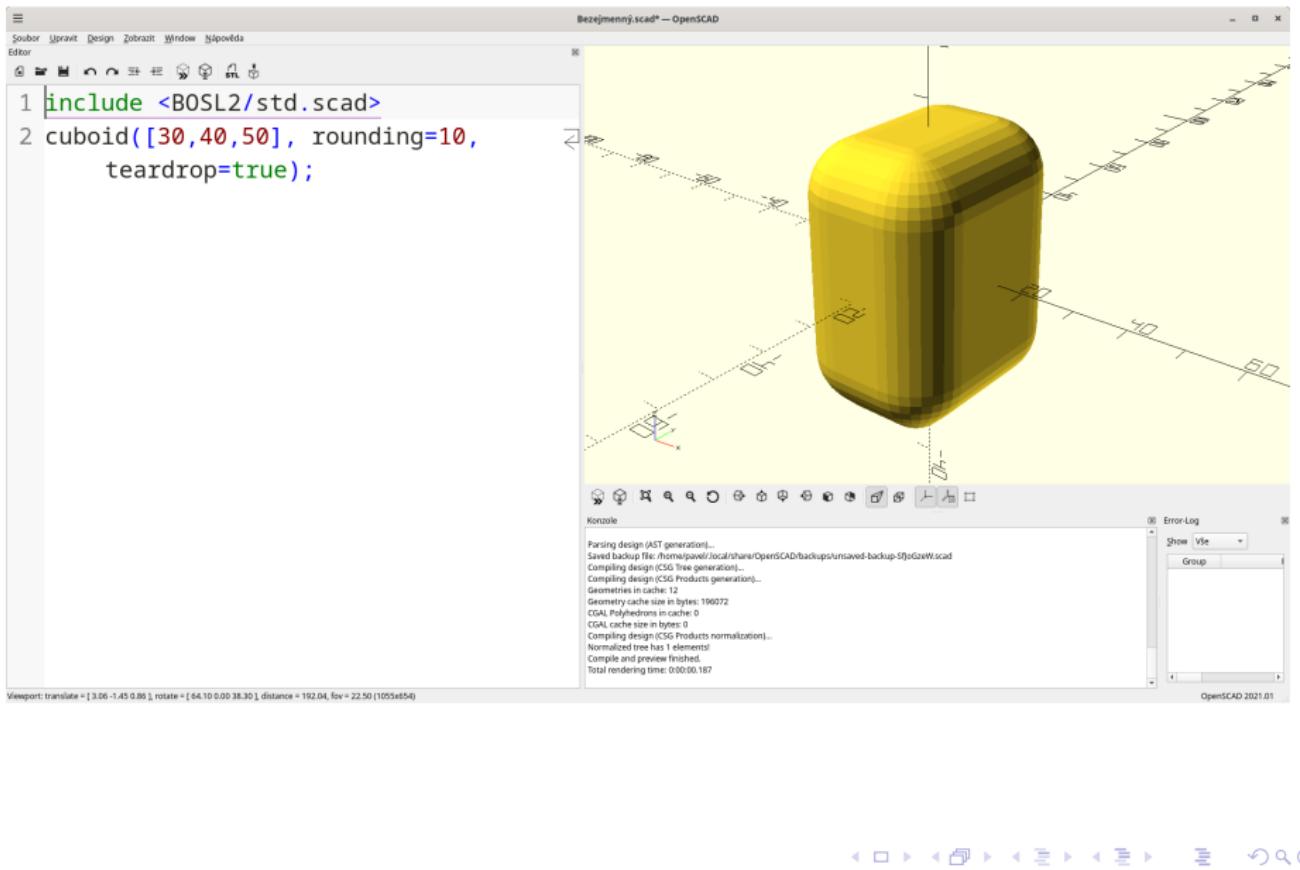
Show View Group File Line

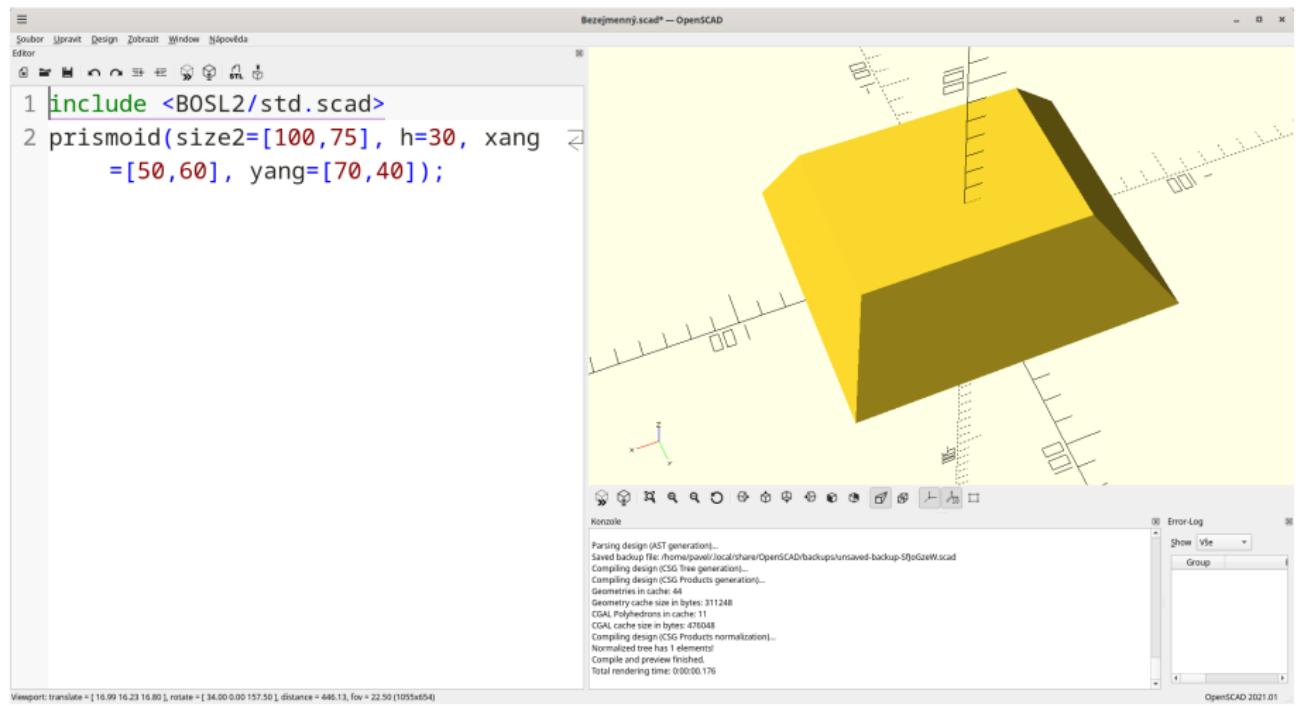
OpenSCAD 2021.01

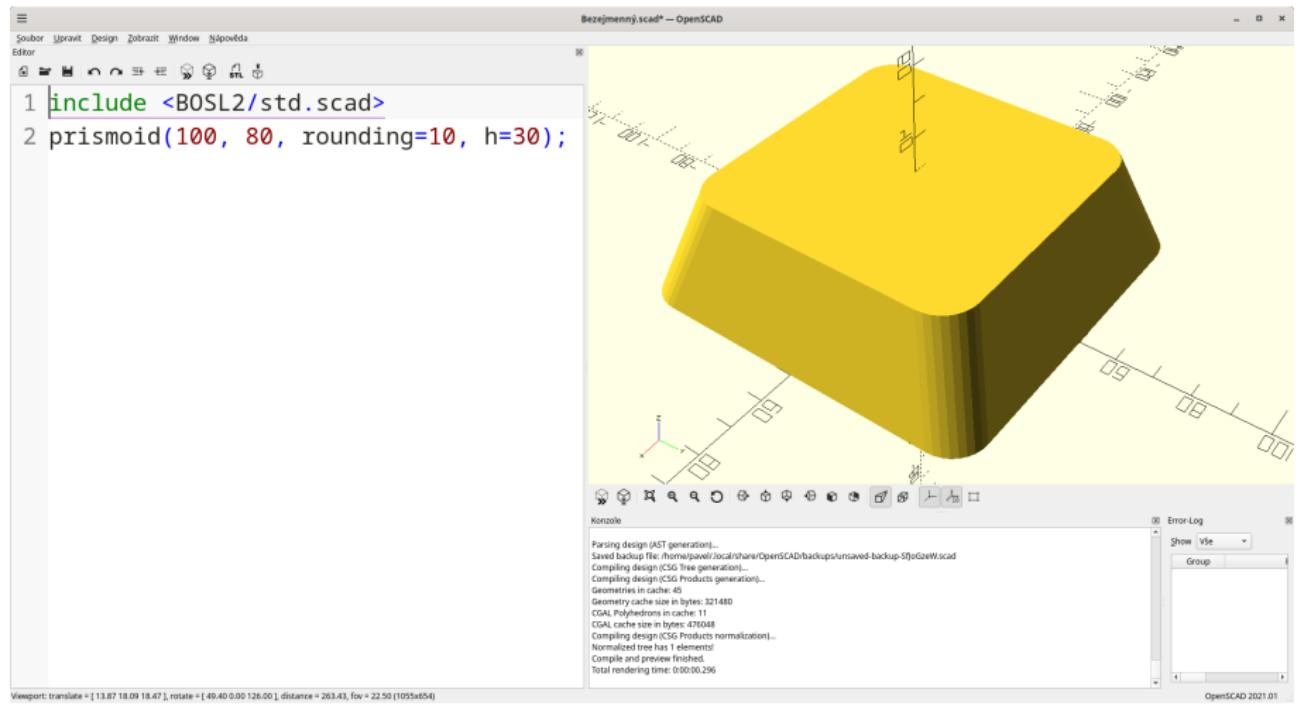
Viewport: translate = [-3.33 0.60 9.56] rotate = [65.50 0.00 164.50] distance = 113.40, fov = 22.50 (905e5d)

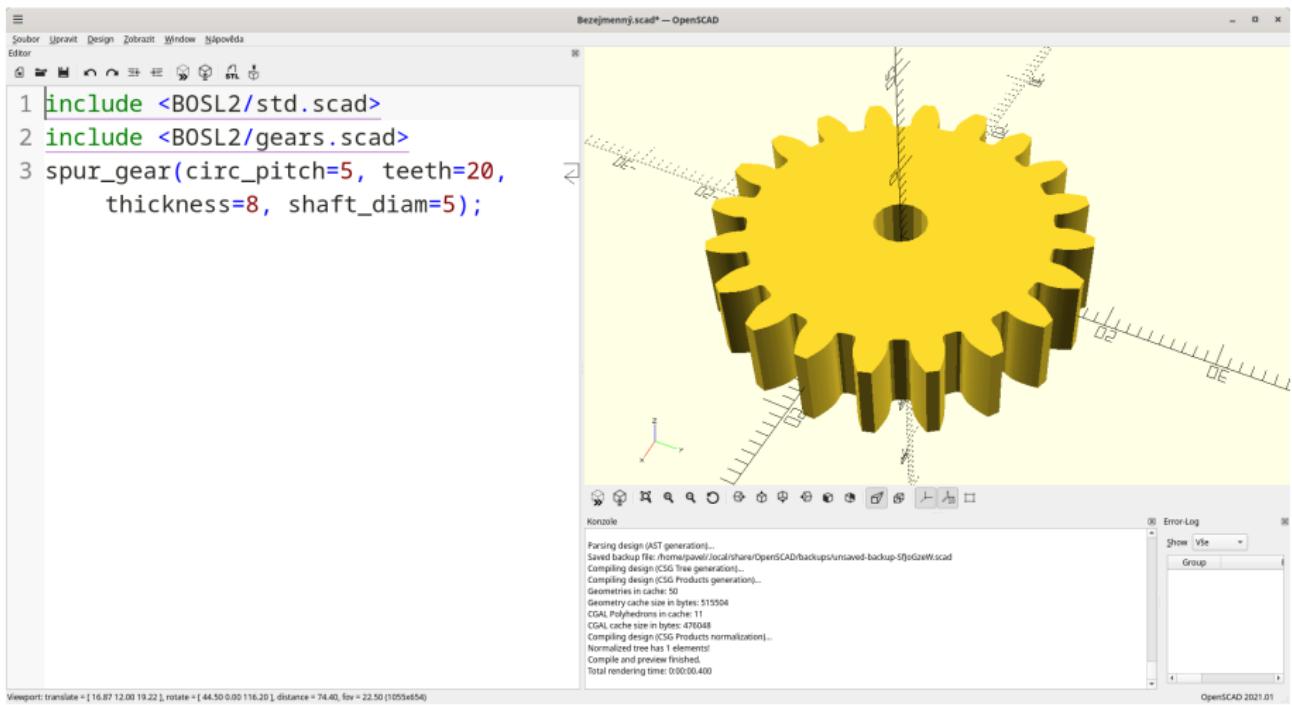
# Knihovna - BOSL2

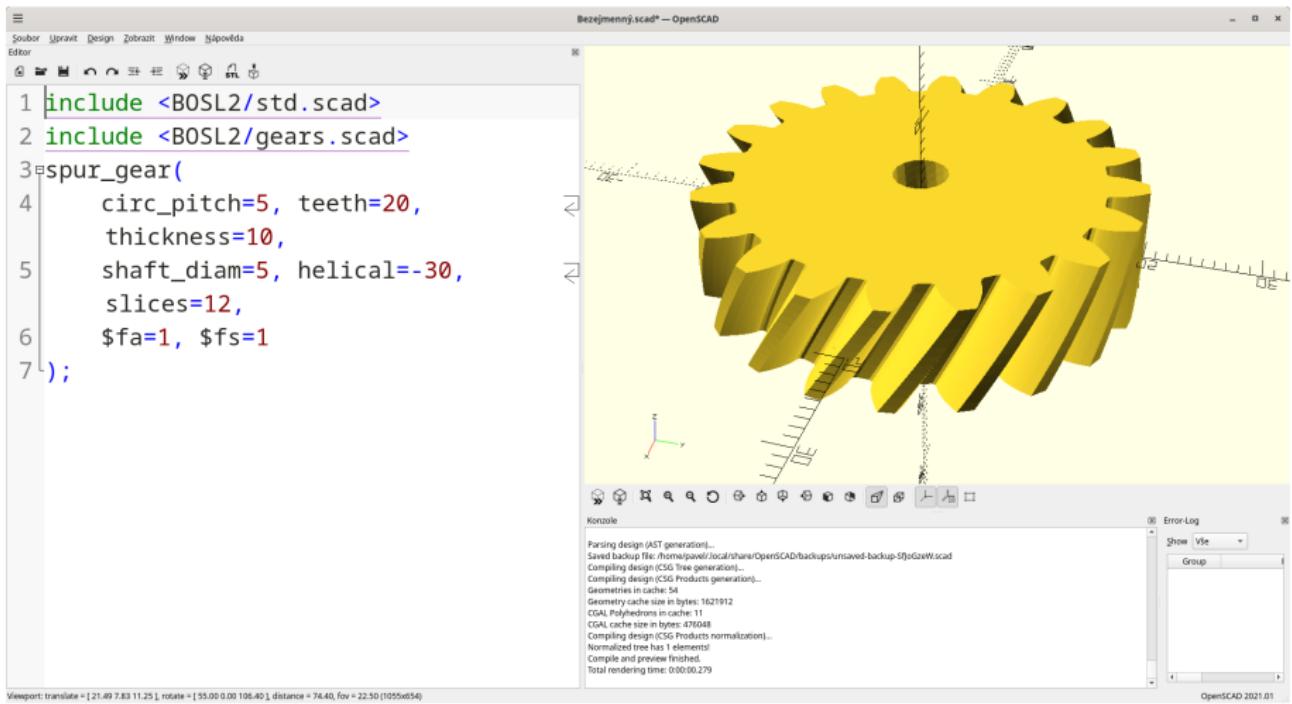
- 2D tvary
- 3D tvary
- ozubená kola
- závity
- ...

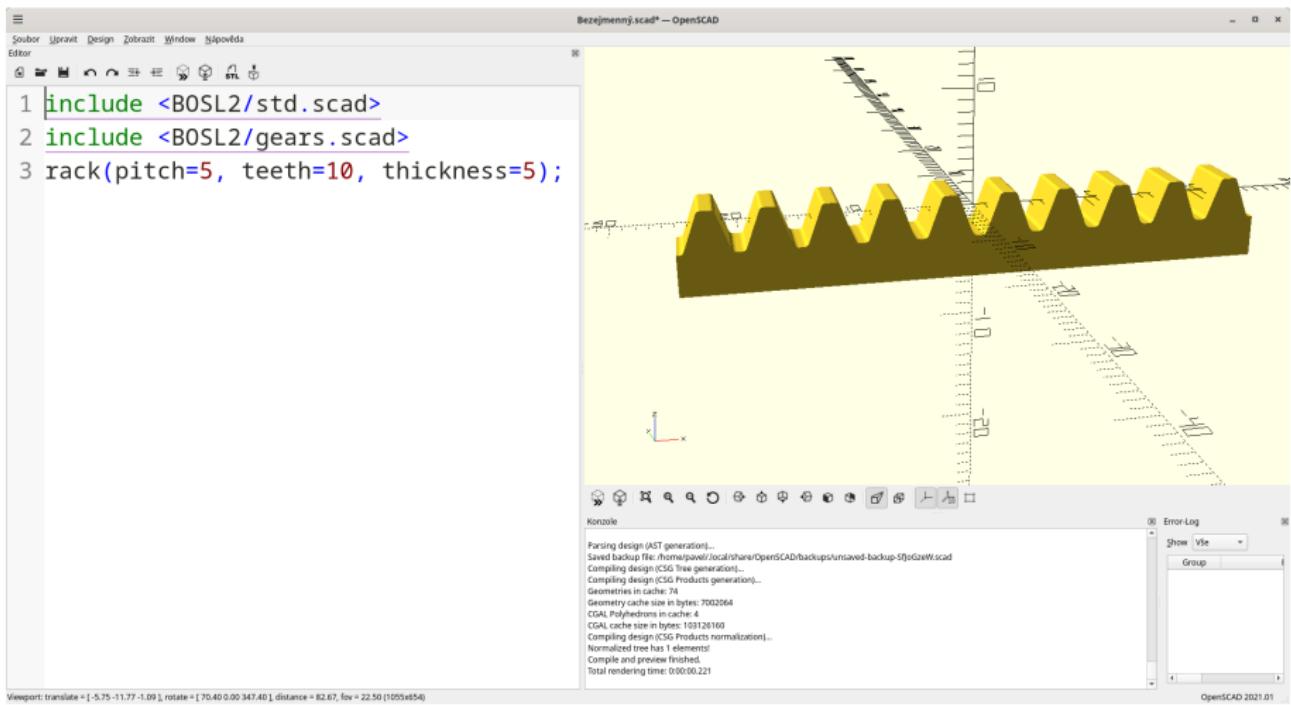


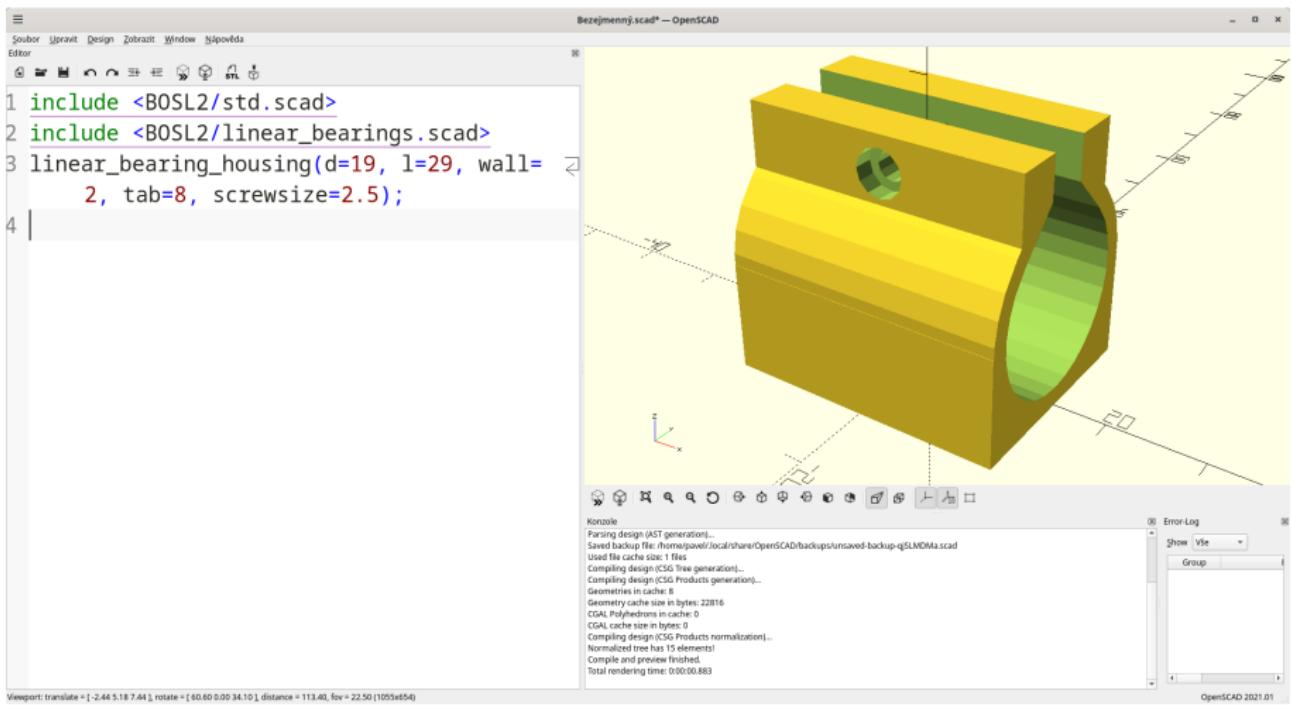


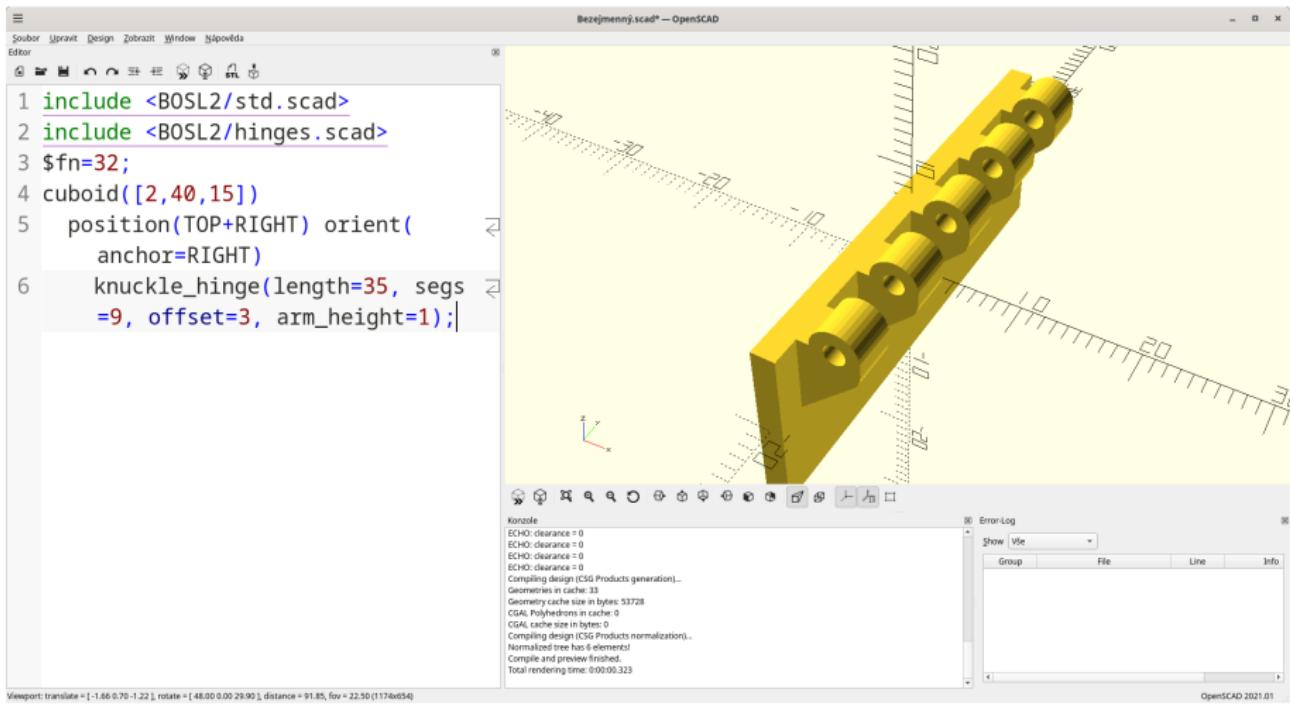


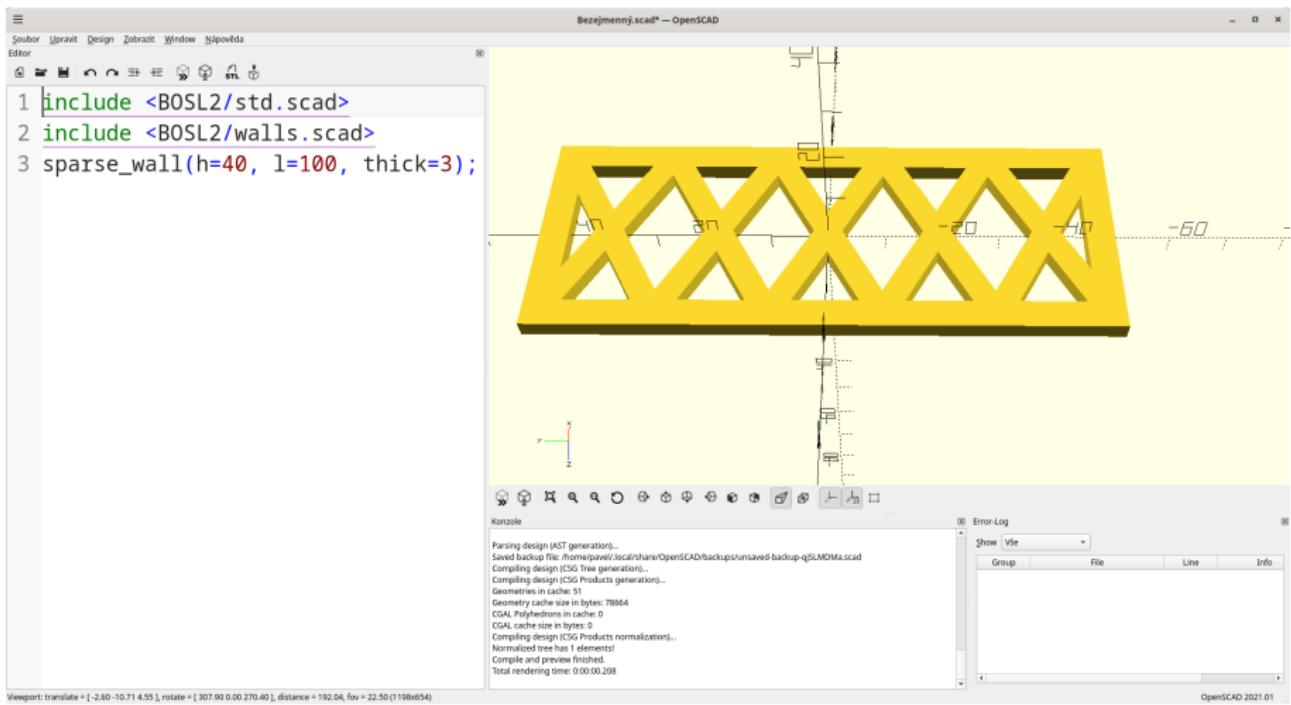


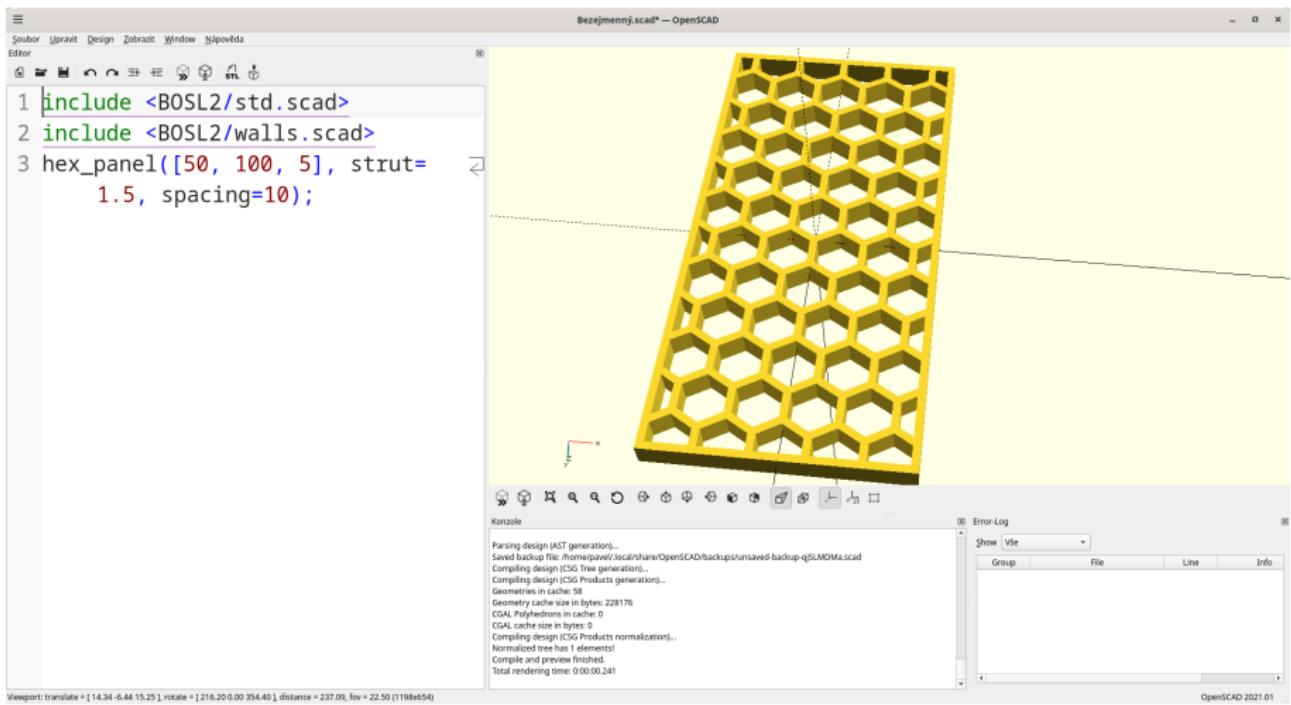












# F3410 3D tisk v praxi

- podzimní semestr
- libovolný obor
- žádné předpoklady
- seznámení s 3D tiskem
- využití 3D tisku
- tvorba jednoduchých 3D modelů – OpenSCAD, FreeCAD, Blender
- zápočet - vlastní 3D model

# F6101 Arduino v laboratoři

- letní semestr
- libovolný obor
- žádné předpoklady
- seznámení studentů s moduly Arduino – základní vlastnosti, programování, vstupní a výstupní zařízení a přídavné moduly.
- zápočet - účast