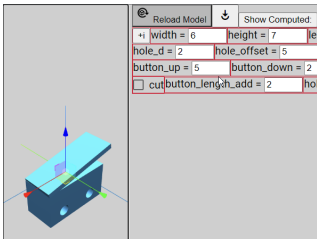
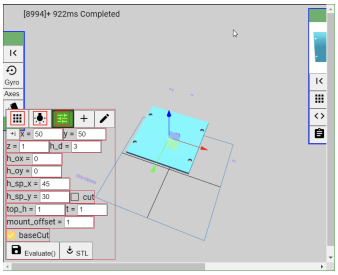
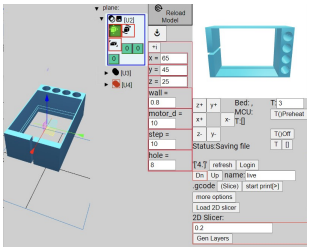
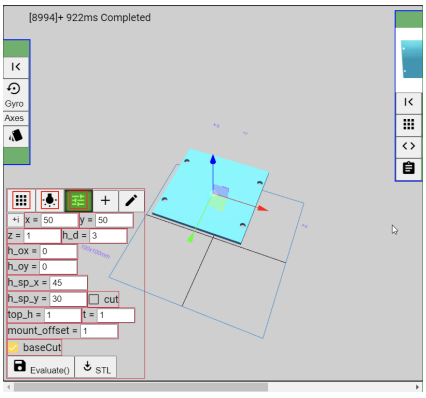
Introduction:

The idea is to provide means of quickly prototyping parametric mechanisms by leveraging the 3D printing technology. InventInside.com

User Interface

User interface:	
inventinside.com/editor/{partid}/small 	Intended for end-users; Generating and downloading files.
inventinside.com/editor/{partid} 	Editor is intended for building parts and assemblies. Variables can be assigned to produce parametric designs.
inventinside.com/editor/{partid}/split 	3D Printer production All in One (AIO) view: 3D printer controller (Duet3D), (must be on the same network) CuraEngine slicer in wasm. Additional DXF 2D slicing.(BROKEN)

Editor Interface

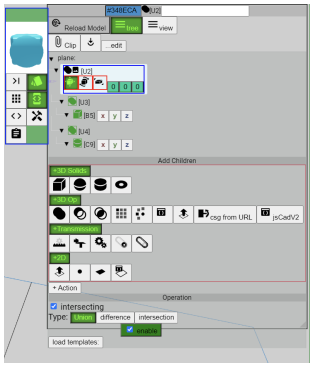


There are three primary panels.

1. Part documentation. (left)
2. Selected object manipulation. (right)
3. Variable/Parameter editor. (bottom)

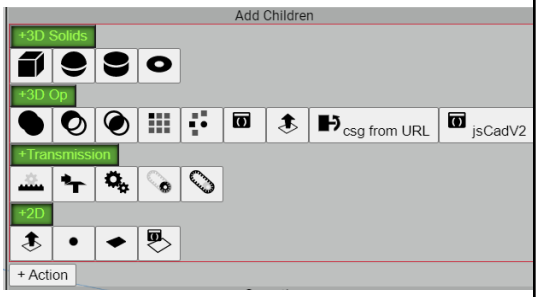
Selected Object

Currently selected object is highlighted.



All of the properties correspond to the object in BLUE outline.

If an object supports children, they may be added as children.

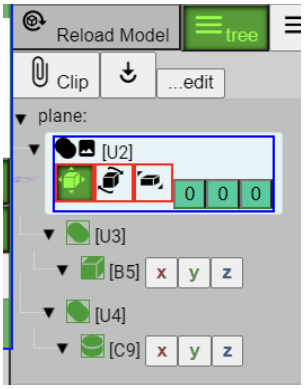


Part tree defines the geometry.

Each object is defined as a tree of operations.

Sometimes reloading is invoked by UI actions. (end of transformations)

“Reload Model” button initiates computation

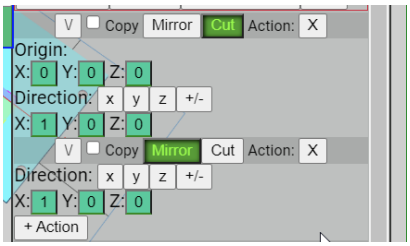
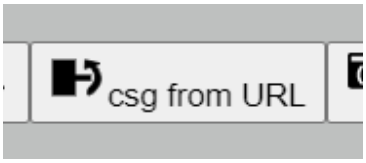


Operations which support children:

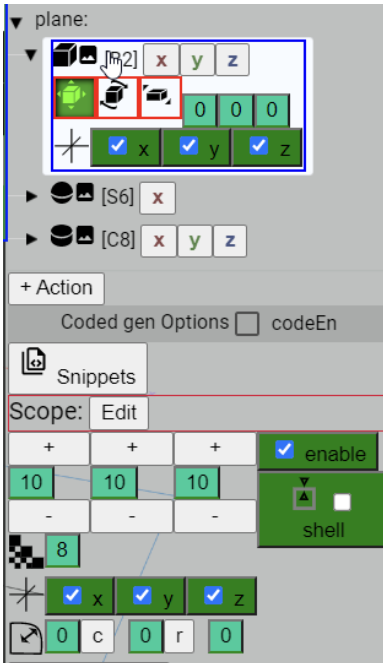
Union
DIfference
Intersection

Repetitions: Xyz, Radial

Code.

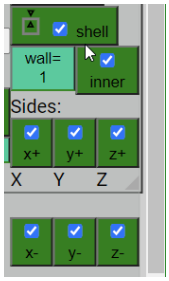
manually.	
Actions - (Post-processing): After the computation of the object, additional actions can be performed. Cut-planes Reflections Copy - adds to original object.	
CodeV2 - *new version.* jscadV2 2D - (Broken) Does not support children.	Code - *currently used version* jscadV1 Maker.js
	Load any compressed jscadV1 CSG. Upload STL files and use them within the app.

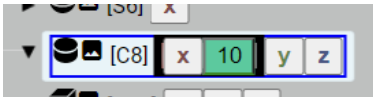
Objects



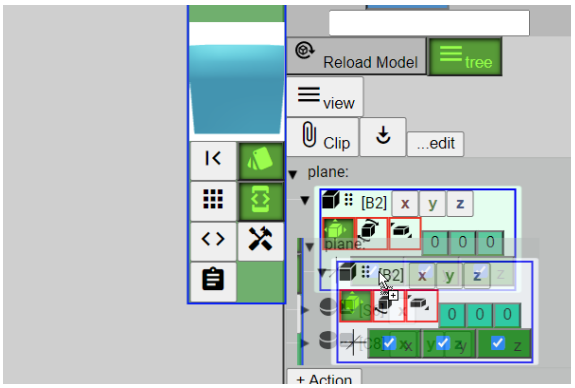
C - copy all rounding values [x,y,z].
R - reset to 0.

After selecting, transformation and alignment controls appear under the selected object.

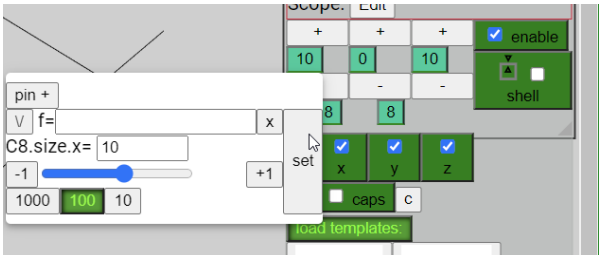
Enables the output of this object, or else returns empty space.	
Additional controls may appear after enabling.	

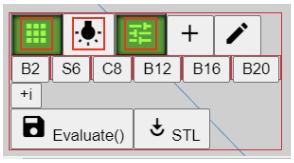
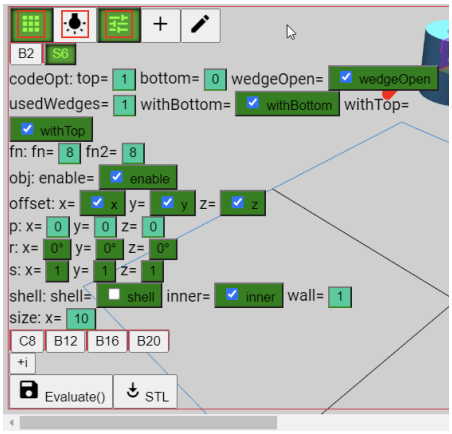


Clicking the UI control variables selects the control point and reveals the variable.

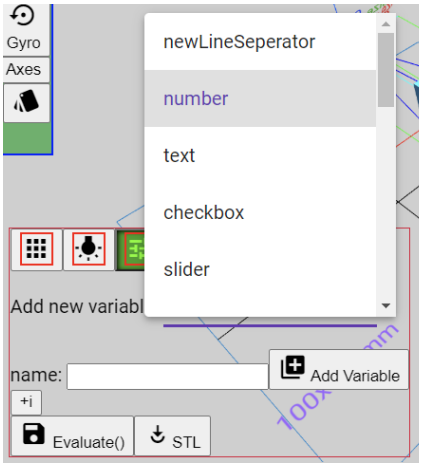
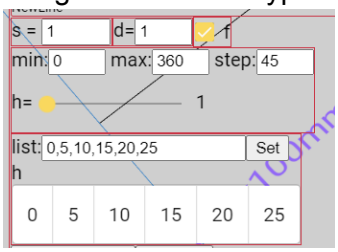
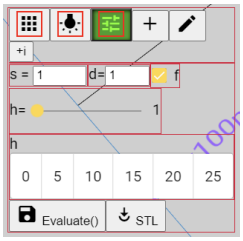
	Objects may be dragged between tree nodes. (Drag+Control) = clones the object to its destination.

Variables

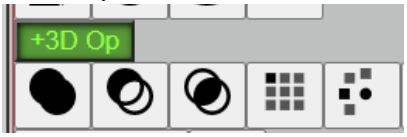
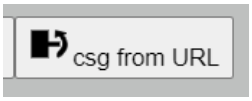
 Variable address is also given. Each variable belongs to an object of a unique name. (C8 in this case) Variable may also belong to a sub-category (size in this case)	Variable control window will open after clicking on green variable buttons.  The display number represents the numerical solution of the parameter. Parameters may be defined as functions which are evaluated within a scope of all object parameters. Math.js - mathematics computation engine. https://mathjs.org/docs/getting_started.html If the expression f= is blank, a numeric value defined by the slider/number input is used. Button “Set” updates the geometry. (Reload model)
Any parameters declared by an object or user may be used during evaluation.	Each object maintains a range of parameters which define its state.

	These in addition to user parameters then are used to define the part.
	Subcategories: Position - p Rotation - r Scale - s Resolution - fn, fn2 CP - sIze Control Point enabled parameters.

User Variables

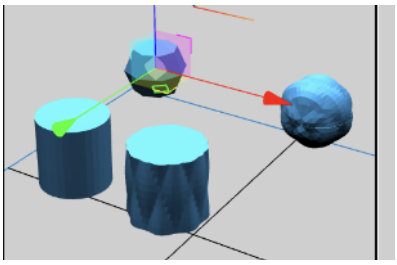
	Assign a name and type of input.  (edit)  (view) Sliders, Toggles, Buttons, Numbers, Text
	Use them as defined within any variable. *Inside code: Assign local scope variable.*

Basic Geometry

Solids:  	Basic Ops: 
Code OP:  Write CAD code here: jsCadV1 (current stable)  Write CAD code here: jsCadV2 (under development)	Advanced: Implicit geometry mesher algorithm.  Import pre-computed objects from the url or other part.  Complicated geometry generators:  Gears, Belts, pulleys and racks. 2d - (under development)

Parametric Geometry plotting

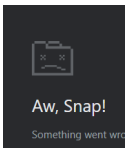
Both sphere and cylinders can be plotted in space based on user defined function. While maintaining a shape similar to the base component.

	Samples can be seen here: https://inventinside.com/editor/IvmOmIFnObyMiQUSNlYj/small

Periodic helper functions:	Filtering functions:
sin(x,n) cos(x,n) tan(x,n) abs(x,n) uv(u,v,N) opt.userVar - var array []	filter(x,min,max) filterUV(u,v,x,startU,startV,endU,endV) filterUVgrid(u,v,x,nU,nV,gU,gV,startU,startV,endU,endV)

Sphear

In this case the resolution is considered in spherical segments.



Res: max 64x64

(Must “set” res variable)-BUG

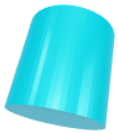
Example:

Res:8x8	Res:16x16
	
Res:32x32	
	

Code:

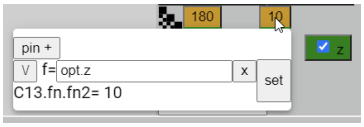
```
let depth = (1/(opt.x/10))*0.1;
let scale = opt.x/10;
res.rAzimuthPole = function ( u, v, t )  {
    return 1 +
    abs(
    depth*sin(v*(scale)-u*(scale),3) *
    cos(u*(scale)+v*(scale),3)
    )  ;
}
```

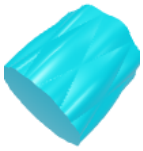
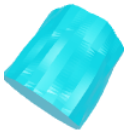
Cylinder



In this case the resolution is considered in Radial and Height segments.

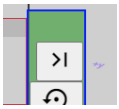
proTip: Set Height resolution to be a function of height.



Res 360x360	Res64x64
	
Res 32x32 	

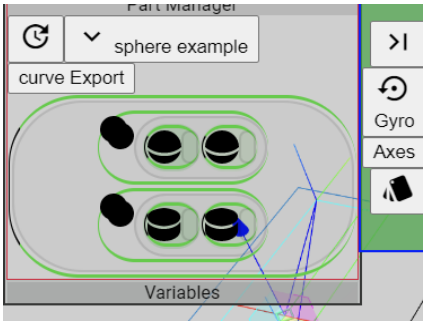
```
let h = opt.z/100;

res.rCircHeight = function ( u, v, t )
{
    return
1+0.08*abs(sin(v*h-u,opt.y)*sin(v*h+u,opt.y));
}
```

Exporting to Curv3D

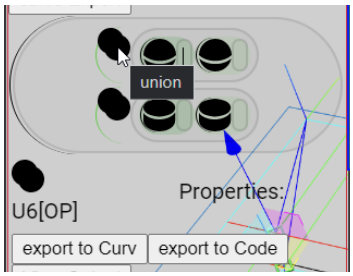


1. Open the left side panel.

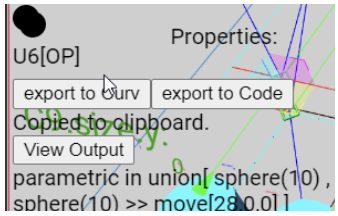
2. Open Curv exporter panel.



3. Select the object which will be the root of the export.



4. Click export to Curv



Output in Curv3d

Now the object tree is translated to Curv3d and inside your clipboard.

Click “View Parameter”
To see output,

parametric in

union[
sphere(10)
,
sphere(10) >> move[28.0.0]

]

//nft:https://undefined.ipfs.dweb.link/curv3d.txt

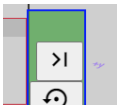
Undefined - cid.

FINE PRINT:

Currently auto-sends a copy to public NFT.storage in raw text, link appended to output.

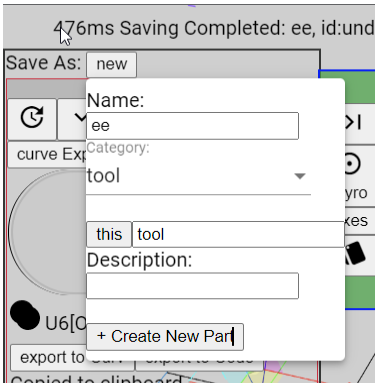
Saving models

Open the left side panel.

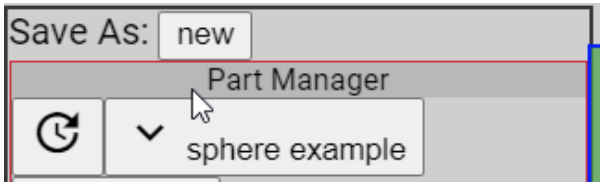


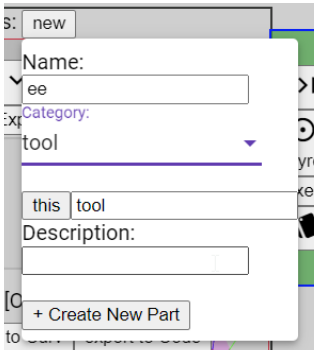
Select “new” to create another copy of an object and create a new object if the editor is blank.

FIll out the information.

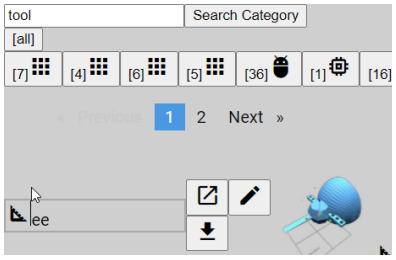


Your new object will be found under that category.





Now under the parts list: https://inventinside.com/parts



Search Category you saved, look for your objects name and select it.

Click the arrow button to open the editor view.

After initial saving, the object can be updated using the update button.

https://inventinside.com/editor/1MG6Dp4uhPZRX2MrbAhf

Notice the ID after the editor in the url.