OpenSCAD v2021.01

Syntax

```
var = value;
var = cond ? value_if_true : value_if_false;
var = function (x) x + x;
module name(…) { … }
name();
function name(…) = …
name();
include <….scad>
use <….scad>
```

Constants

undef	undefined value
PI	mathematical constant π (~3.14159)

Operators

n + m	Addition
n - m	Subtraction
n * m	Multiplication
n / m	Division
n % m	Modulo
n ^ m	Exponentiation
n < m	Less Than
n <= m	Less or Equal
b == c	Equal
b != c	Not Equal
n >= m	Greater or Equal
n > m	Greater Than
b && c	Logical And
b || c	Logical Or
!b	Negation

Special variables

$fa	minimum angle
$fs	minimum size
$fn	number of fragments
$t	animation step
$vpr	viewport rotation angles in degrees
$vpt	viewport translation
$vpd	viewport camera distance
$vpf	viewport camera field of view
$children	number of module children
$preview	true in F5 preview, false for F6

Modifier Characters

*	disable
!	show only
#	highlight / debug
%	transparent / background

2D

```
circle(radius | d=diameter)
square(size,center)
square([width,height],center)
polygon([points])
polygon([points],[paths])
text(t, size, font,
     halign, valign, spacing,
     direction, language, script)
import("….ext", convexity)
projection(cut)
```

3D

```
sphere(radius | d=diameter)
cube(size, center)
cube([width,depth,height], center)
cylinder(h,r|d,center)
cylinder(h,r1|d1,r2|d2,center)
polyhedron(points, faces, convexity)
import("….ext", convexity)
linear_extrude(height,center,convexity,twist,slices)
rotate_extrude(angle,convexity)
surface(file = "….ext",center,convexity)
```

Transformations

```
translate([x,y,z])
rotate([x,y,z])
rotate(a, [x,y,z])
scale([x,y,z])
resize([x,y,z],auto,convexity)
mirror([x,y,z])
multmatrix(m)
color("colorname",alpha)
color("#hexvalue")
color([r,g,b,a])
offset(r|delta,chamfer)
hull()
minkowski(convexity)
```

Lists

list = […, …, …];	create a list
var = list[2];	index a list (from 0)
var = list.z;	dot notation indexing (x/y/z)

Boolean operations

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

List Comprehensions

Generate	[for (i = *range*|*list*) i]
Generate	[for (*init*;*condition*;*next*) i]
Flatten	[each i]
Conditions	[for (i = …) if (condition(i)) i]
Conditions	[for (i = …) if (condition(i)) x else y]
Assignments	[for (i = …) let (assignments) a]

Flow Control

```
for (i = [start:end]) { … }
for (i = [start:step:end]) { … }
for (i = […,…,…]) { … }
for (i = …, j = …, …) { … }
intersection_for(i = [start:end]) { … }
intersection_for(i = [start:step:end]) { … }
intersection_for(i = […,…,…]) { … }
if (…) { … }
let (…) { … }
```

Type test functions

```
is_undef
is_bool
is_num
is_string
is_list
is_function
```

Other

echo(…)

render(convexity)

children([idx])

assert(condition, message)

~~assign (…) { … }~~

Functions

```
concat
lookup
str
chr
ord
search
version
version_num
parent_module(idx)
```

Mathematical

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

Links: Official website | Code | Issues | Manual | MCAD library | Mailing list | Other links