

# OpenSCAD

## Cheat Sheet

Version 2021.01

<b>Syntax</b> <pre> \$F1 = union() {   \$F2 = cone(z=10, r1=10, r2=5, h=10, \$F3);   \$F4 = translate(10, 10, 10) {     \$F5 = sphere(r=10);   };   \$F6 = rotate(45) {     \$F7 = cylinder(r=10, h=10);   }; }; </pre>	<b>Modifier Characters</b> <pre> ! absolute % relative _ relative to previous ^ absolute to origin ~ absolute to origin </pre>	<b>Lists</b> <pre> list(x1, x2, ..., xn) create a list list(\$F1, \$F2, ..., \$Fn) create a list of faces list(\$F1, \$F2, ..., \$Fn, \$F) create a list of faces and a function </pre>	<b>Functions</b> <pre> abs(x) absolute value acos(x) arc cosine asin(x) arc sine atan(x) arc tangent atan2(y, x) arc tangent of y/x ceil(x) ceiling cos(x) cosine cylinder(r, h) cylinder cylinder(r1, r2, h) cylinder with frustum cosh(x) hyperbolic cosine cosh(x) hyperbolic cosine cylinder(r, h, \$F) cylinder with a face cylinder(r, h, \$F, \$G) cylinder with two faces cylinder(r, h, \$F, \$G, \$H) cylinder with three faces cylinder(r, h, \$F, \$G, \$H, \$I) cylinder with four faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J) cylinder with five faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K) cylinder with six faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L) cylinder with seven faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M) cylinder with eight faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N) cylinder with nine faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O) cylinder with ten faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P) cylinder with eleven faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q) cylinder with twelve faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R) cylinder with thirteen faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R, \$S) cylinder with fourteen faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R, \$S, \$T) cylinder with fifteen faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R, \$S, \$T, \$U) cylinder with sixteen faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R, \$S, \$T, \$U, \$V) cylinder with seventeen faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R, \$S, \$T, \$U, \$V, \$W) cylinder with eighteen faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R, \$S, \$T, \$U, \$V, \$W, \$X) cylinder with nineteen faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R, \$S, \$T, \$U, \$V, \$W, \$X, \$Y) cylinder with twenty faces </pre>
<b>Constants</b> <pre> \$PI 3.141592653589793238462643383279502884197169399375105820974944592307816406286208996660712019616256241317 </pre>	<b>2D</b> <pre> \$F1 = union() {   \$F2 = circle(r=10);   \$F3 = square(s=10);   \$F4 = rectangle(x1=10, x2=20, y1=10, y2=20);   \$F5 = circle(r=10, \$F6);   \$F7 = circle(r=10, \$F6, \$F8);   \$F9 = circle(r=10, \$F6, \$F8, \$F10); }; </pre>	<b>Boolean operations</b> <pre> intersect(\$F1, \$F2) union(\$F1, \$F2) difference(\$F1, \$F2) </pre>	<b>Mathematical</b> <pre> acos(x) arc cosine asin(x) arc sine atan(x) arc tangent atan2(y, x) arc tangent of y/x ceil(x) ceiling cos(x) cosine cylinder(r, h) cylinder cylinder(r1, r2, h) cylinder with frustum cosh(x) hyperbolic cosine cosh(x) hyperbolic cosine cylinder(r, h, \$F) cylinder with a face cylinder(r, h, \$F, \$G) cylinder with two faces cylinder(r, h, \$F, \$G, \$H) cylinder with three faces cylinder(r, h, \$F, \$G, \$H, \$I) cylinder with four faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J) cylinder with five faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K) cylinder with six faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L) cylinder with seven faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M) cylinder with eight faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N) cylinder with nine faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O) cylinder with ten faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P) cylinder with eleven faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q) cylinder with twelve faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R) cylinder with thirteen faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R, \$S) cylinder with fourteen faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R, \$S, \$T) cylinder with fifteen faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R, \$S, \$T, \$U) cylinder with sixteen faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R, \$S, \$T, \$U, \$V) cylinder with seventeen faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R, \$S, \$T, \$U, \$V, \$W) cylinder with eighteen faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R, \$S, \$T, \$U, \$V, \$W, \$X) cylinder with nineteen faces cylinder(r, h, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R, \$S, \$T, \$U, \$V, \$W, \$X, \$Y) cylinder with twenty faces </pre>
<b>Operators</b> <pre> + addition - subtraction * multiplication / division % modulo ^ power ~ bitwise NOT &amp; bitwise AND   bitwise OR ^ bitwise XOR &amp;&amp; bitwise AND (short-circuit)    bitwise OR (short-circuit) ! logical NOT &amp;&amp;&amp; logical AND (short-circuit)     logical OR (short-circuit) </pre>	<b>3D</b> <pre> \$F1 = union() {   \$F2 = sphere(r=10);   \$F3 = cylinder(r=10, h=10);   \$F4 = cone(z=10, r1=10, r2=5, h=10);   \$F5 = translate(10, 10, 10) {     \$F6 = sphere(r=10);   };   \$F7 = rotate(45) {     \$F8 = cylinder(r=10, h=10);   }; }; </pre>	<b>LIST Comprehensions</b> <pre> list(\$F1, \$F2, ..., \$Fn) list(\$F1, \$F2, ..., \$Fn, \$F) list(\$F1, \$F2, ..., \$Fn, \$F, \$G) list(\$F1, \$F2, ..., \$Fn, \$F, \$G, \$H) list(\$F1, \$F2, ..., \$Fn, \$F, \$G, \$H, \$I) list(\$F1, \$F2, ..., \$Fn, \$F, \$G, \$H, \$I, \$J) list(\$F1, \$F2, ..., \$Fn, \$F, \$G, \$H, \$I, \$J, \$K) list(\$F1, \$F2, ..., \$Fn, \$F, \$G, \$H, \$I, \$J, \$K, \$L) list(\$F1, \$F2, ..., \$Fn, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M) list(\$F1, \$F2, ..., \$Fn, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N) list(\$F1, \$F2, ..., \$Fn, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O) list(\$F1, \$F2, ..., \$Fn, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P) list(\$F1, \$F2, ..., \$Fn, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q) list(\$F1, \$F2, ..., \$Fn, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R) list(\$F1, \$F2, ..., \$Fn, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R, \$S) list(\$F1, \$F2, ..., \$Fn, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R, \$S, \$T) list(\$F1, \$F2, ..., \$Fn, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R, \$S, \$T, \$U) list(\$F1, \$F2, ..., \$Fn, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R, \$S, \$T, \$U, \$V) list(\$F1, \$F2, ..., \$Fn, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R, \$S, \$T, \$U, \$V, \$W) list(\$F1, \$F2, ..., \$Fn, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R, \$S, \$T, \$U, \$V, \$W, \$X) list(\$F1, \$F2, ..., \$Fn, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R, \$S, \$T, \$U, \$V, \$W, \$X, \$Y) list(\$F1, \$F2, ..., \$Fn, \$F, \$G, \$H, \$I, \$J, \$K, \$L, \$M, \$N, \$O, \$P, \$Q, \$R, \$S, \$T, \$U, \$V, \$W, \$X, \$Y, \$Z) </pre>	<b>Flow Control</b> <pre> if(\$F1) {   \$F2 = cylinder(r=10, h=10); } else {   \$F2 = sphere(r=10); } for(\$F1, \$F2, ..., \$Fn) {   \$F3 = cylinder(r=10, h=10); } while(\$F1) {   \$F2 = cylinder(r=10, h=10); } do {   \$F2 = cylinder(r=10, h=10); } while(\$F1); </pre>
<b>Special variables</b> <pre> \$F1 = union() {   \$F2 = cylinder(r=10, h=10);   \$F3 = sphere(r=10);   \$F4 = translate(10, 10, 10) {     \$F5 = sphere(r=10);   };   \$F6 = rotate(45) {     \$F7 = cylinder(r=10, h=10);   }; }; </pre>	<b>Transformations</b> <pre> translate(x, y, z) rotate(a, b, c) scale(x, y, z) mirror(x, y, z) </pre>	<b>Type Test Functions</b> <pre> is_bool(x) is_int(x) is_float(x) is_string(x) is_list(x) is_function(x) </pre>	<b>Other</b> <pre> \$F1 = union() {   \$F2 = cylinder(r=10, h=10);   \$F3 = sphere(r=10);   \$F4 = translate(10, 10, 10) {     \$F5 = sphere(r=10);   };   \$F6 = rotate(45) {     \$F7 = cylinder(r=10, h=10);   }; }; </pre>

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