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BREP Terminology

vertex	A single point in space
edge	A connection between two or more vertices along a particular path (called a curve)
wire	A collection of edges that are connected together
face	A set of edges or wires that enclose a surface
shell	A collection of faces that are connected together along some of their edges
solid	A shell that has a closed interior
compound	A collection of solids

Named Planes

Available named planes are as follows. Direction references refer to the global directions.

Name	xDir	yDir	zDir
XY	+x	+y	+z
YZ	+y	+z	+x
XZ	+x	+z	-y
front	+x	+y	+z
back	-x	+y	-z
left	+z	+y	-x
right	-z	+y	+x
top	+x	-z	+y
bottom	+x	+z	-y

Core Classes

Class	Description
CQ(obj)	Provides enhanced functionality for a wrapped CAD primitive.
Plane(origin, xDir, normal)	A 2d coordinate system in space, with the x-y axes on the a plane, and a particular point as the origin.
Workplane(inPlane[origin, obj])	Defines a coordinate system in space, in which 2D coordinates can be used.

Selector Methods

CadQuery selector strings allow filtering various types of object lists. Most commonly, Edges, Faces, and Vertices are used, but all objects types can be filtered.

Selector Method	Description
CQ.faces(selector=None)	Select the faces of objects on the stack, optionally filtering the selection.
CQ.edges(selector=None)	Select the edges of objects on the stack, optionally filtering the selection.

CQ.vertices(selector=None)	Select the vertices of objects on the stack, optionally filtering the selection.
CQ.solids(selector=None)	Select the solids of objects on the stack, optionally filtering the selection.
CQ.shells(selector=None)	Select the shells of objects on the stack, optionally filtering the selection.

Selector Classes

Class	Description
NearestToPointSelector(pnt)	Selects object nearest the provided point.
ParallelDirSelector(vector[tolerance])	Selects objects parallel with the provided direction.
DirectionSelector(vector[tolerance])	Selects objects aligned with the provided direction.
PerpendicularDirSelector(vector[tolerance])	Selects objects perpendicular with the provided direction.
TypeSelector(typeString)	Selects objects of the prescribed topological type.
DirectionMinMaxSelector(vector[directionMax])	Selects objects closest or farthest in the specified direction.
StringSyntaxSelector(selectorString)	Filter lists objects using a simple string syntax.

Selector String Modifiers

Selectors are a complex topic: see CadQuery String Selectors for more information.
Axis Strings are: X, Y, Z, XY, YZ, XZ

Modifier	Description
|	Parallel to (same as ParallelDirSelector). Can return multiple objects.
#	Perpendicular to (same as PerpendicularDirSelector)
+	Positive direction (same as DirectionSelector)
-	Negative direction (same as DirectionSelector)
>	Maximize (same as DirectionMinMaxSelector with directionMax=True)
<	Minimize (same as DirectionMinMaxSelector with directionMax=False)
%	Curve/surface type (same as TypeSelector)

Examples of Filtering Faces

All types of filters work on faces. In most cases, the selector refers to the direction of the normal vector of the face. If a face is not planar, selectors are evaluated at the center of mass of the face. This can lead to results that are quite unexpected.

Selector	Selector Class	Selects	# Objects Returned
+Z	DirectionSelector	Faces with normal in +z direction	0 or 1
|Z	ParallelDirSelector	Faces parallel to xy plane	0..many
-X	DirectionSelector	Faces with normal in neg x direction	0..many
#Z	PerpendicularDirSelector	Faces perpendicular to z direction	0..many
%Plane	TypeSelector	Faces of type plane	0..many

>Y	DirectionMinMaxSelector	Face farthest in the positive y dir	0 or 1
<Y	DirectionMinMaxSelector	Face farthest in the negative y dir	0 or 1

Examples of Filtering Edges

Some filter types are not supported for edges. The selector usually refers to the direction of the edge. Non-linear edges are not selected for any selectors except type (%). Non-linear edges are never returned when these filters are applied.

Selector	Selector Class	Selects	# Objects Returned
+Z	DirectionSelector	Edges aligned in the Z direction	0..many
|Z	ParallelDirSelector	Edges parallel to z direction	0..many
-X	DirectionSelector	Edges aligned in neg x direction	0..many
#Z	PerpendicularDirSelector	Edges perpendicular to z direction	0..many
%Plane	TypeSelector	Edges type line	0..many
>Y	DirectionMinMaxSelector	Edges farthest in the positive y dir	0 or 1
<Y	DirectionMinMaxSelector	Edges farthest in the negative y dir	0 or 1

Examples of Filtering Vertices

Only a few of the filter types apply to vertices. The location of the vertex is the subject of the filter.

Selector	Selector Class	Selects	# Objects Returned
>Y	DirectionMinMaxSelector	Vertices farthest in the positive y dir	0 or 1
<Y	DirectionMinMaxSelector	Vertices farthest in the negative y dir	0 or 1