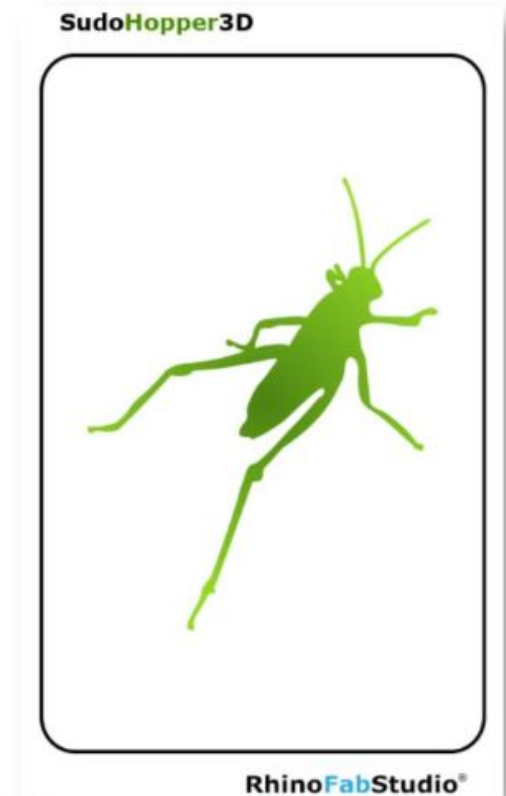
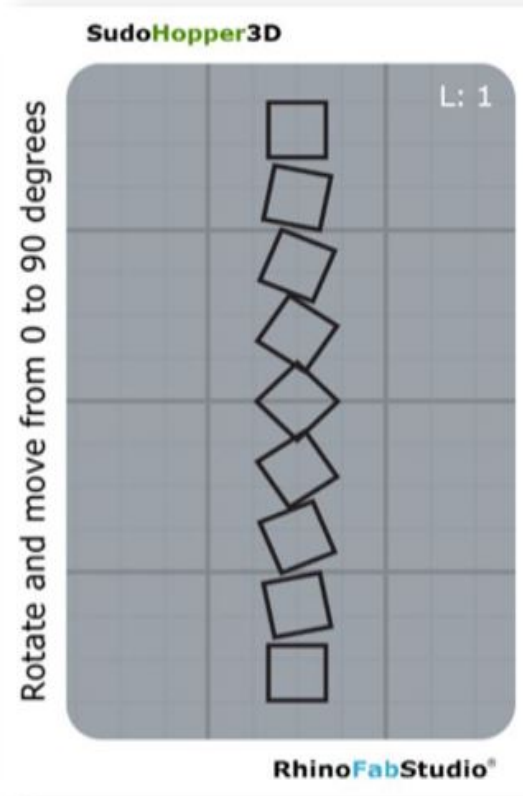
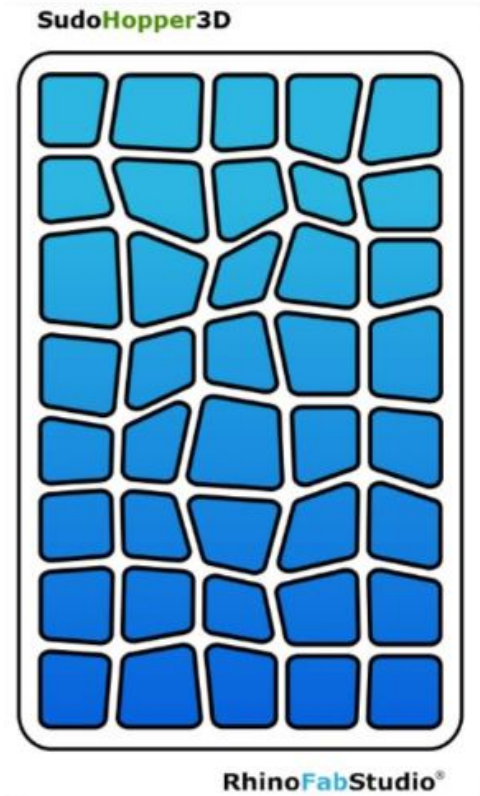


Teacher's guide

Level: 1

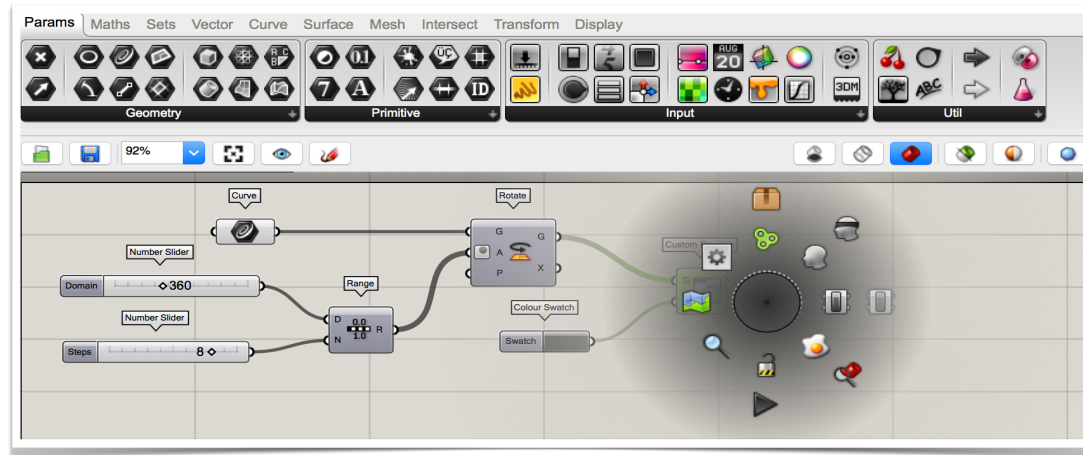


SudoHopper3D

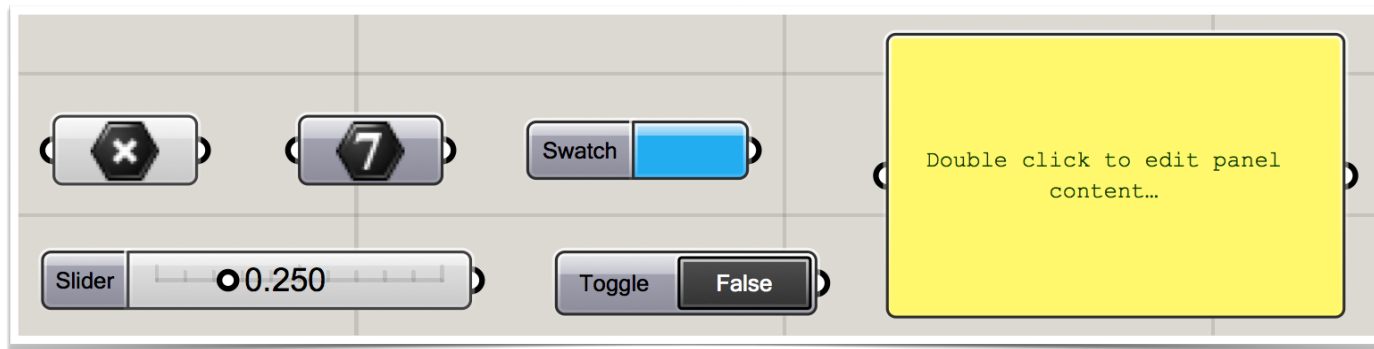
Play, ponder and learn

Few things you need to know before you start solving all the assignments:

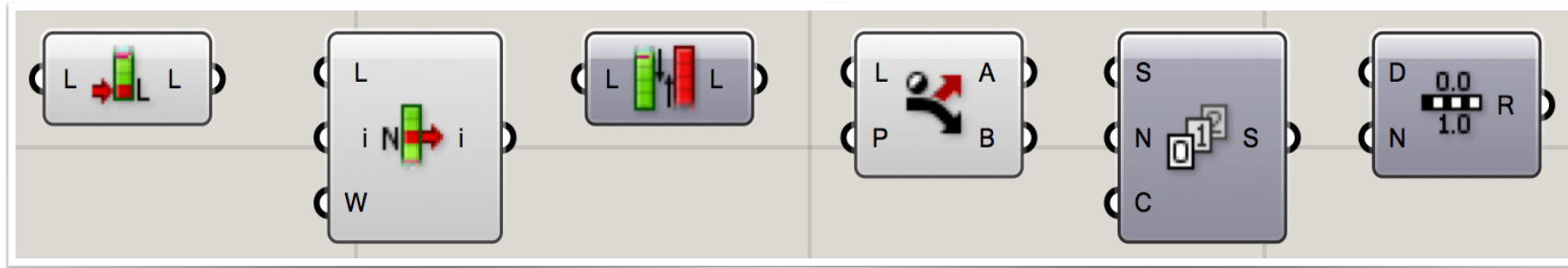
1) Learn the interface of Grasshopper [[Play Video](#)]

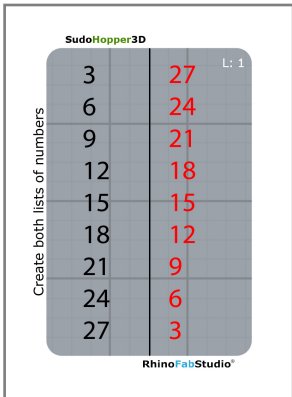


2) Introduction to parameters [[Play Video](#)]

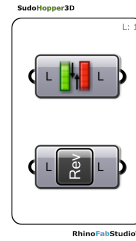


3) Learn what a list is, short introduction [[Play Video](#)]

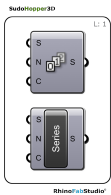




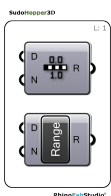
Play Video: Create both lists of numbers.



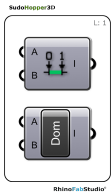
Reverse: Reverse the order of a list. The new index of each element will be $N-i$ where N is the highest index in the list and i is the old index of the element.



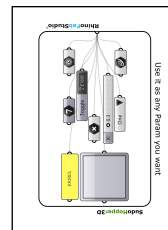
Series: Create a series of numbers. The numbers are spaced according to the {Step} value. If you need to distribute numbers inside a fixed numeric range, consider using the [Range] component instead.



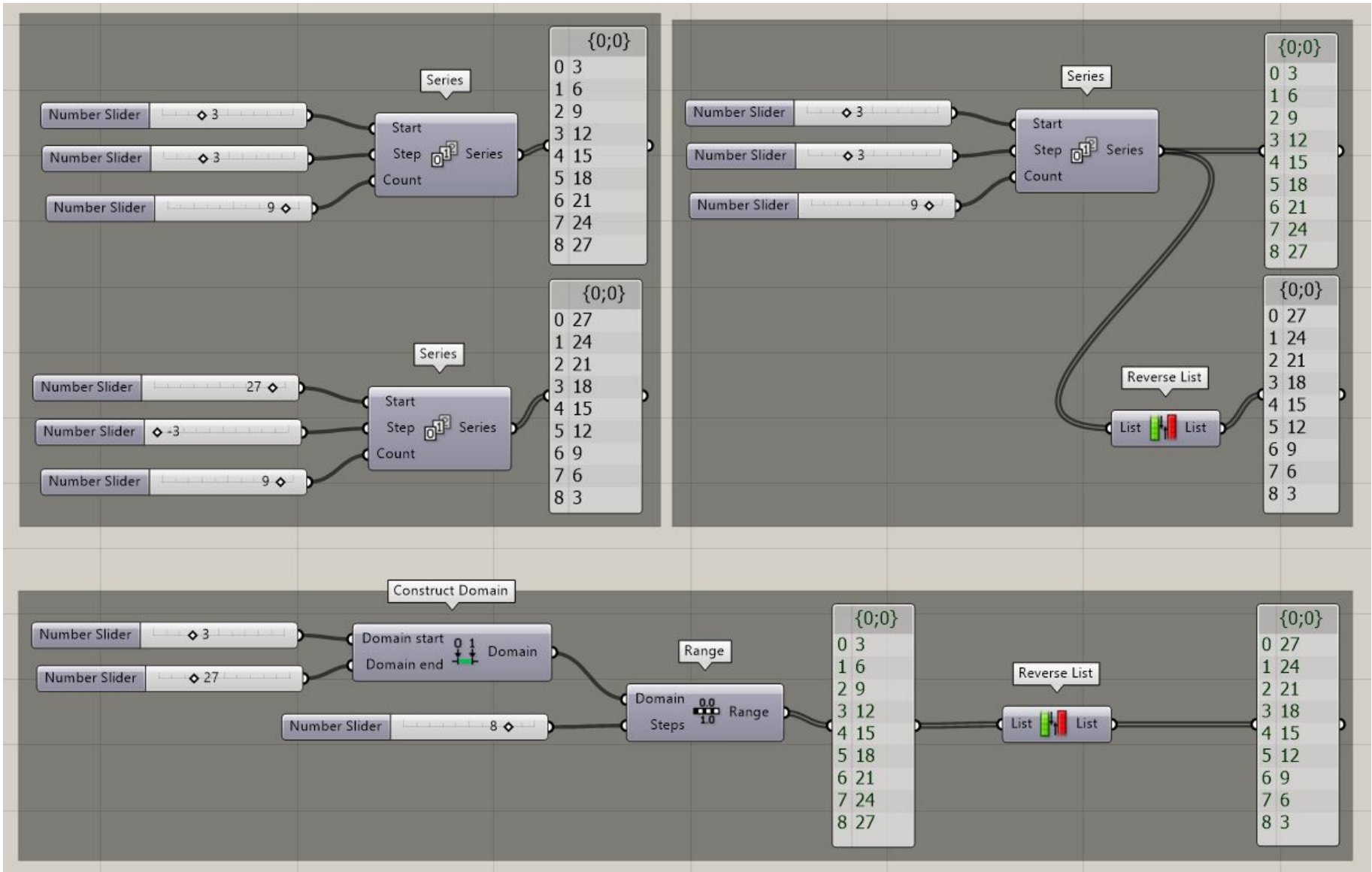
Range: Create a range of numbers. The numbers are spaced equally inside a numeric domain. Use this component if you need to create numbers between extremes. If you need control over the interval between successive numbers, you should be using the [Series] component.

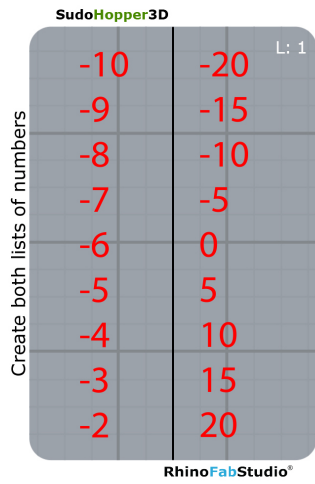


Domain: Create a numeric domain from two numeric extremes.

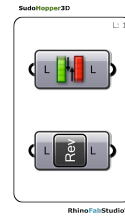


Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.

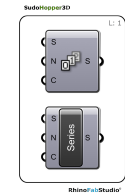




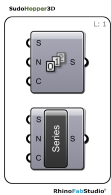
Play Video: Create both lists of numbers.



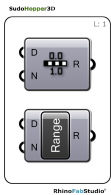
Reverse: Reverse the order of a list. The new index of each element will be $N-i$ where N is the highest index in the list and i is the old index of the element.



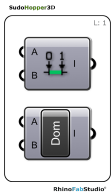
Series: Create a series of numbers. The numbers are spaced according to the {Step} value. If you need to distribute numbers inside a fixed numeric range, consider using the [Range] component instead.



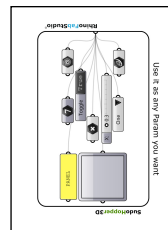
Series: Create a series of numbers. The numbers are spaced according to the {Step} value. If you need to distribute numbers inside a fixed numeric range, consider using the [Range] component instead.



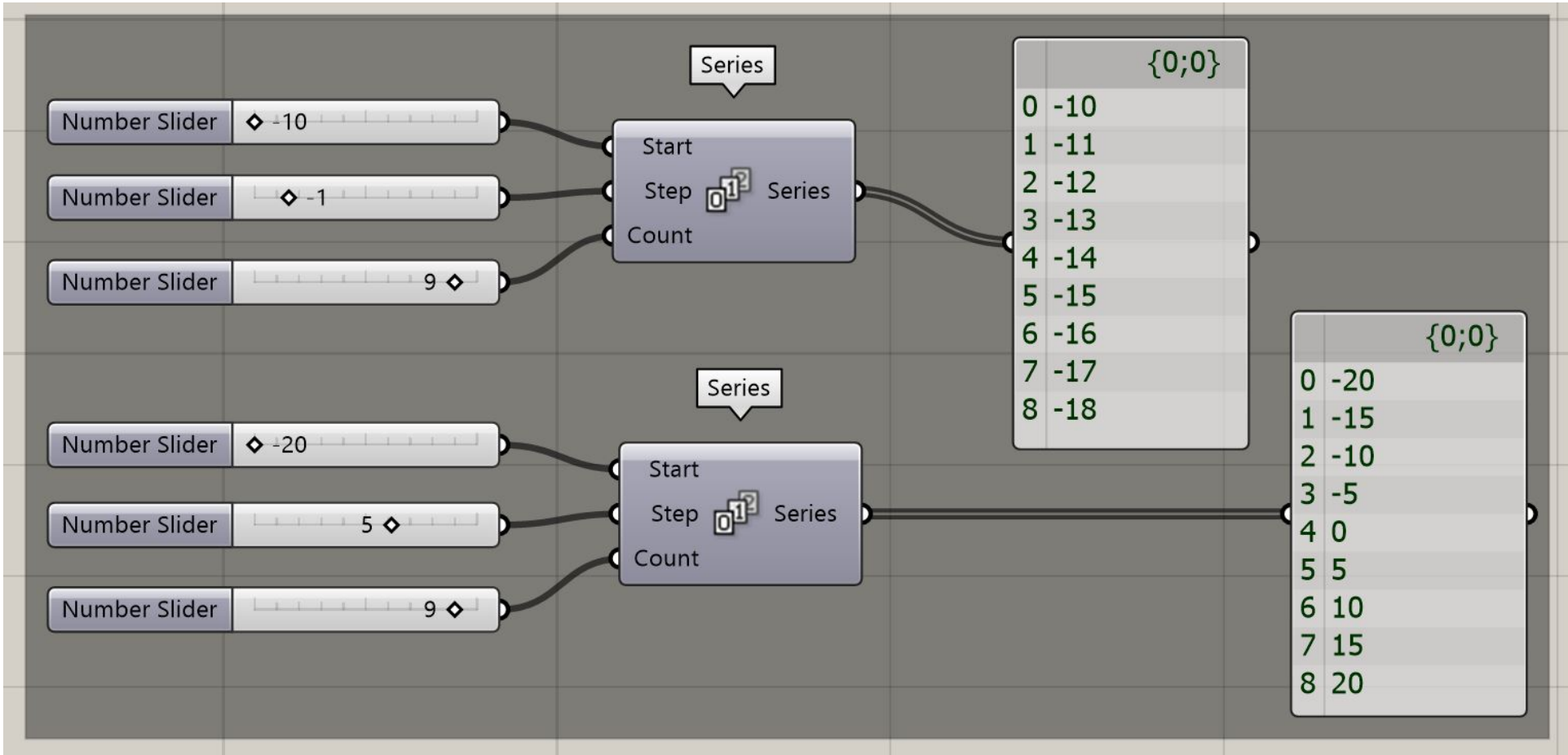
Range: Create a range of numbers. The numbers are spaced equally inside a numeric domain. Use this component if you need to create numbers between extremes. If you need control over the interval between successive numbers, you should be using the [Series] component.

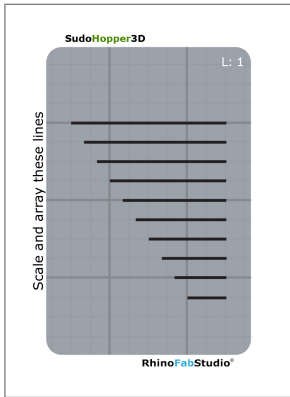


Domain: Create a numeric domain from two numeric extremes.



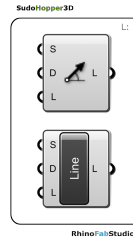
Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.



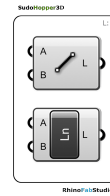


3

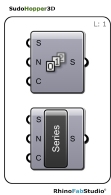
Play Video: Draw and scale few lines in the X axis



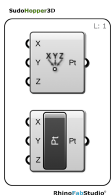
SDL: Create a line segment defined by start point, tangent and length.



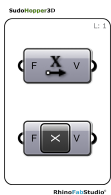
Line: Create a line between two points.



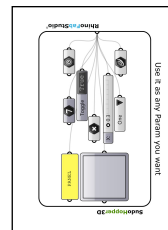
Series: Create a series of numbers. The numbers are spaced according to the {Step} value. If you need to distribute numbers inside a fixed numeric range, consider using the [Range] component instead.



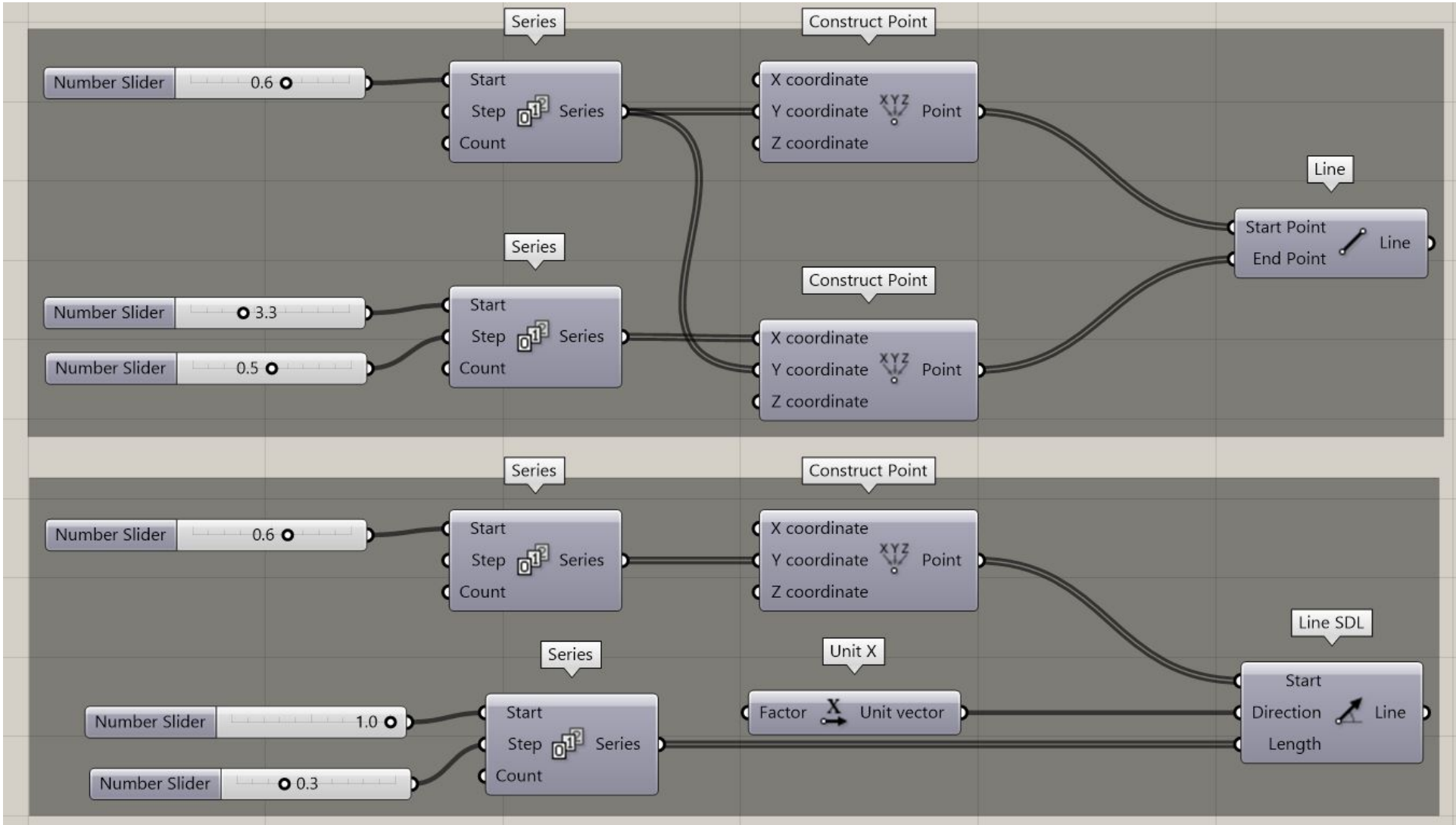
Construct Point: Construct a point from {xyz} coordinates.

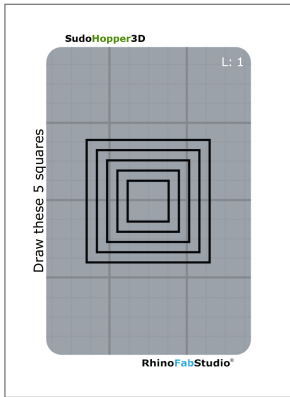


Unit X: Unit vector parallel to the world {x} axis.



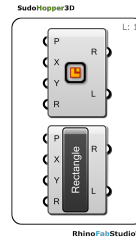
Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.



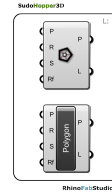


4

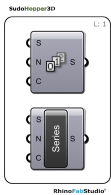
Play Video: Draw an square and scale it few times out



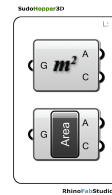
Rectangle: Create a rectangle on a plane



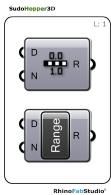
Polygon: Create a polygon with optional round edges.



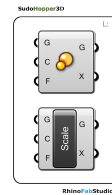
Series: Create a series of numbers. The numbers are spaced according to the {Step} value. If you need to distribute numbers inside a fixed numeric range, consider using the [Range] component instead.



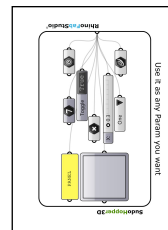
Area: Solve area properties for breps, meshes and planar closed curves.



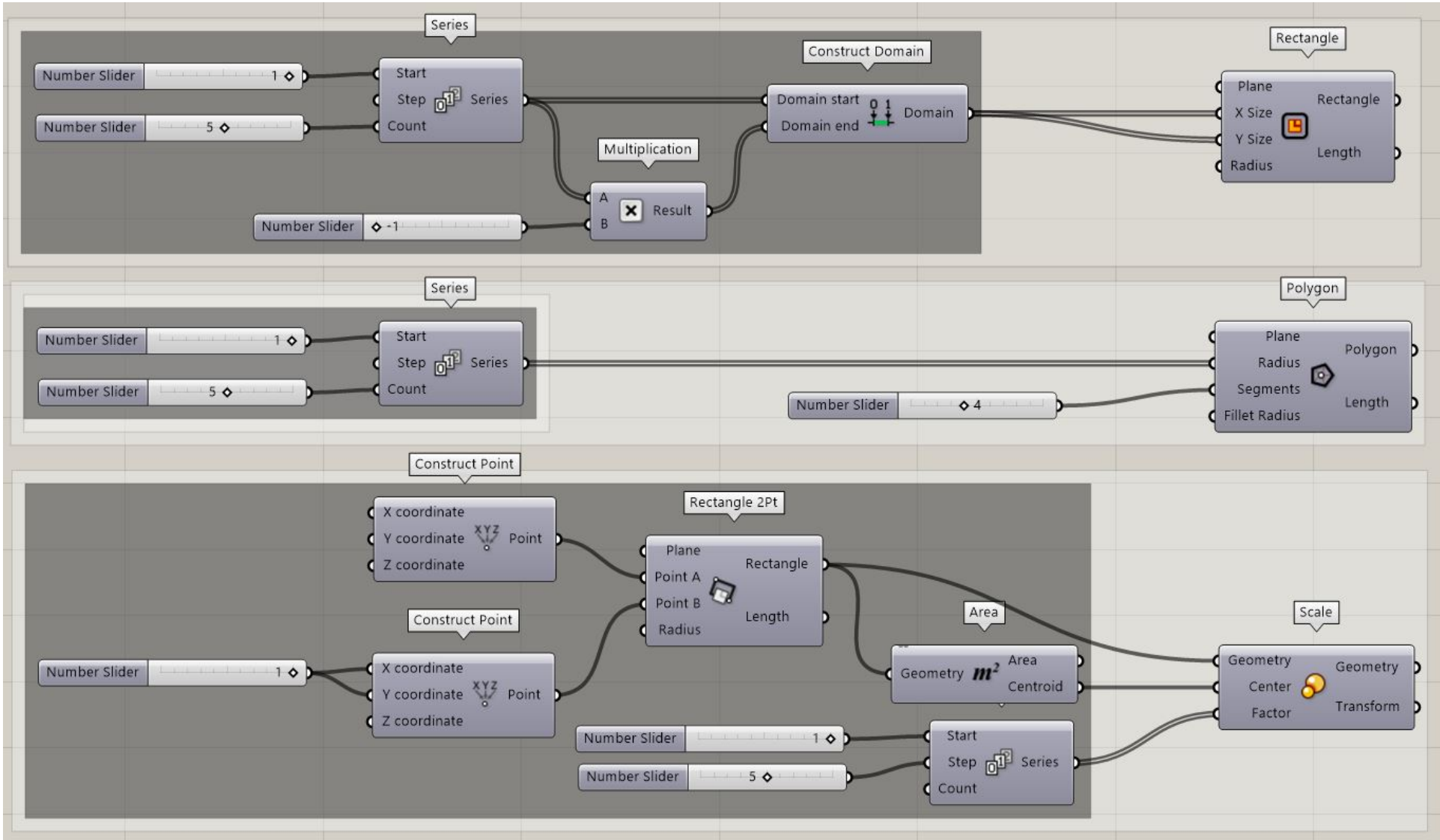
Range: Create a range of numbers. The numbers are spaced equally inside a numeric domain. Use this component if you need to create numbers between extremes. If you need control over the interval between successive numbers, you should be using the [Series] component.

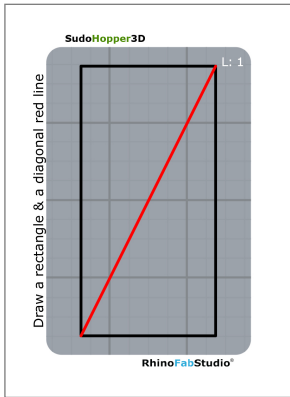


Scale: Scale an object uniformly in all directions.



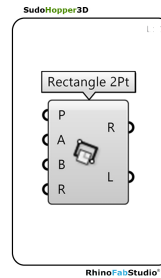
Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.



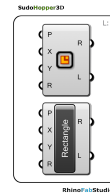


5

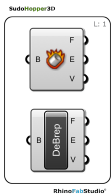
Play Video: Draw a rectangle with a diagonal line



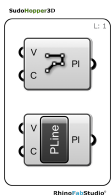
Rectangle 2Pt: Create a rectangle from a base plane and two points



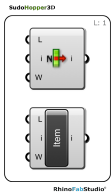
Rectangle: Create a rectangle on a plane



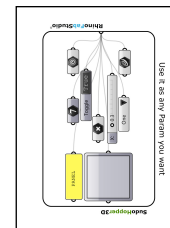
Deconstruct: Deconstruct a brep into its constituent parts.



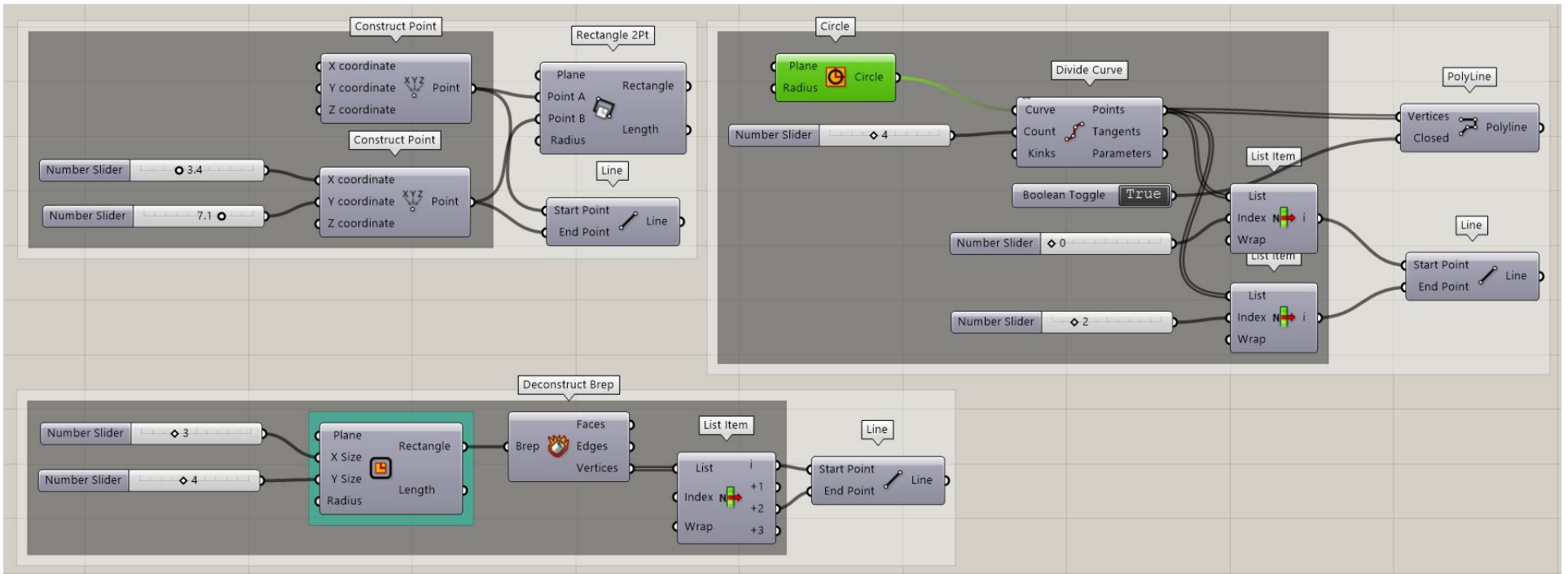
PolyLine: Create a polyline connecting a number of points.

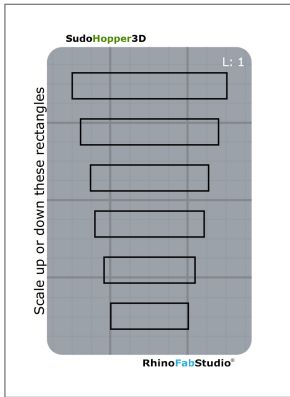


List Item: Retrieve a specific item from a list.



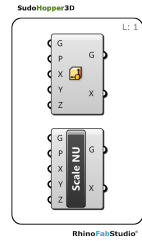
Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.





6

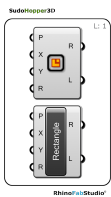
Play Video: Copy and array few rectangles



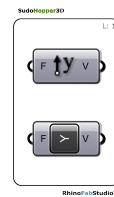
Scale NU: Scale an object with non-uniform factors.



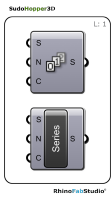
Move: Translate (move) an object along a vector.



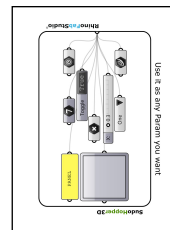
Rectangle: Create a rectangle on a plane



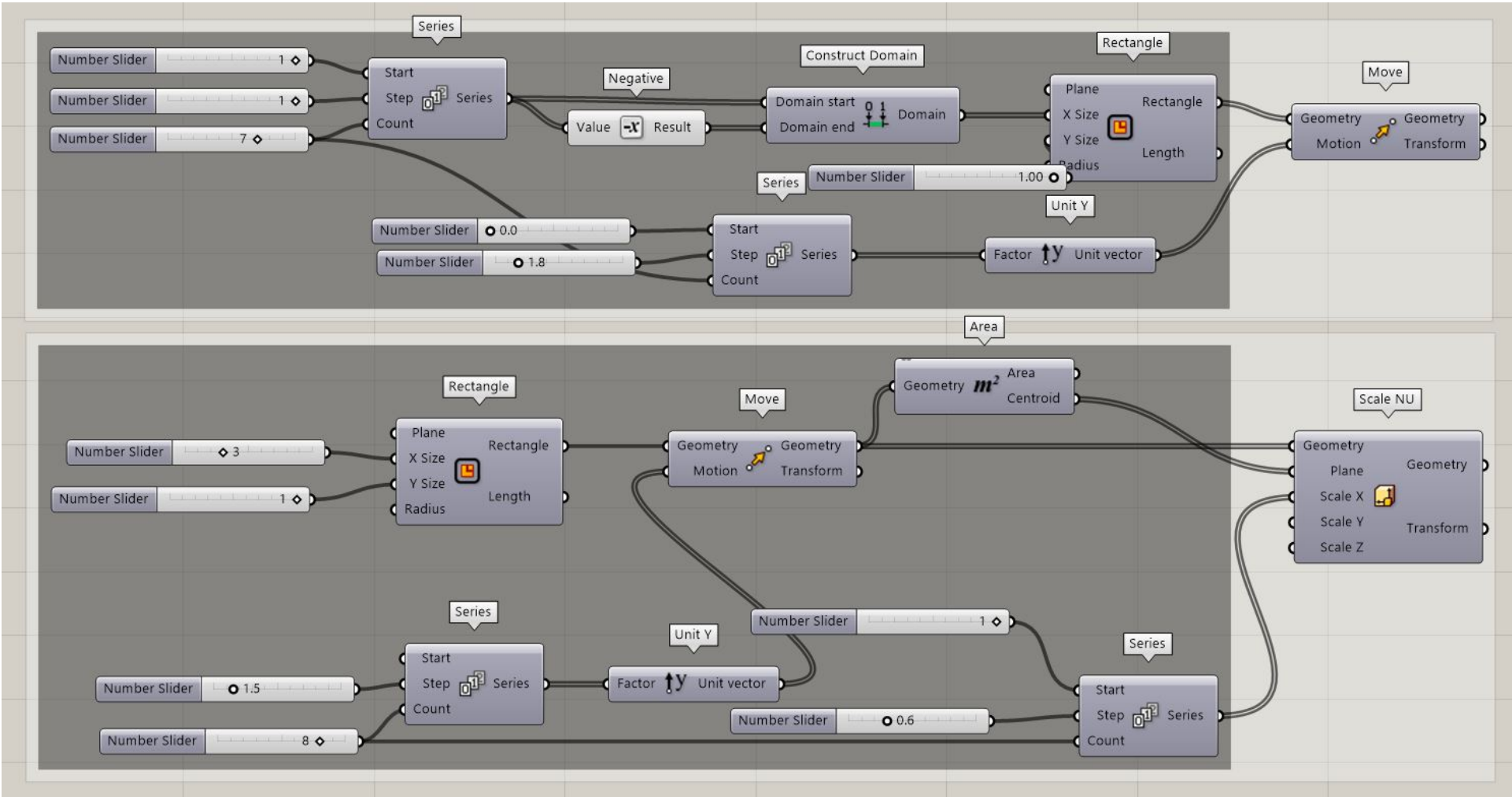
Unit Y: Unit vector parallel to the world {y} axis.



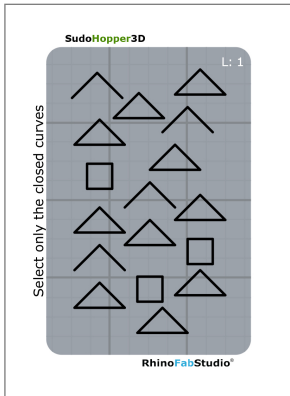
Series: Create a series of numbers. The numbers are spaced according to the {Step} value. If you need to distribute numbers inside a fixed numeric range, consider using the [Range] component instead.



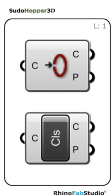
Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.



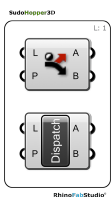
7



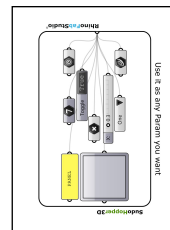
Play Video: Select only closed curves



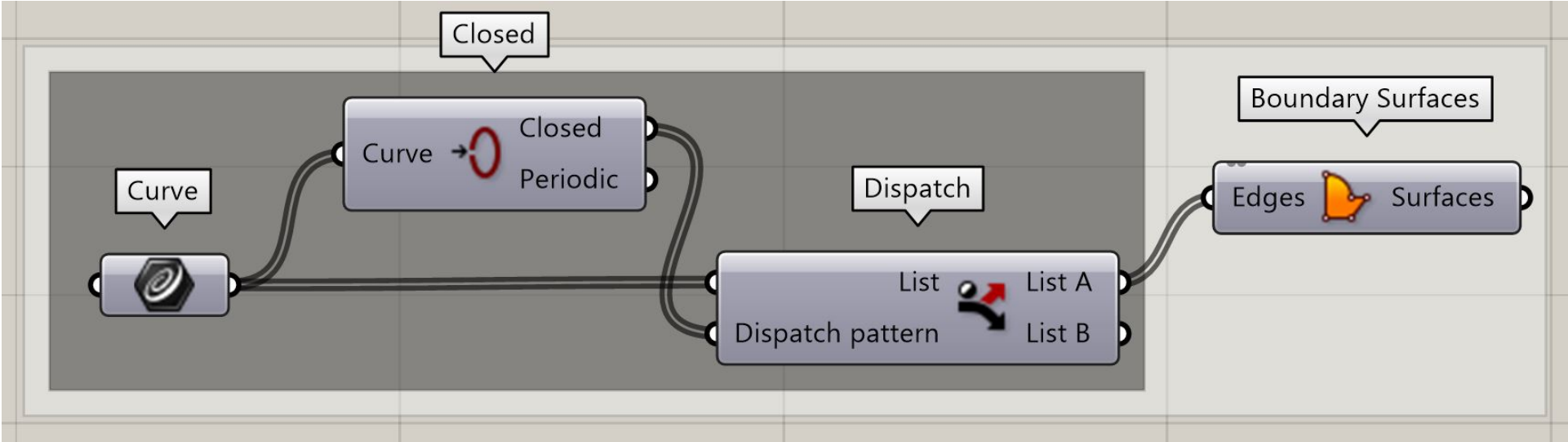
Closed: Test if a curve is closed or periodic.

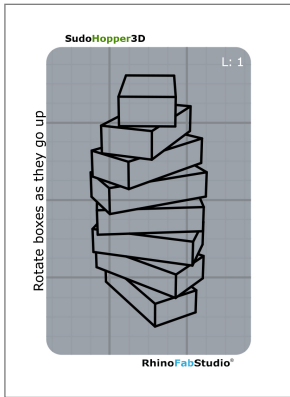


Dispatch: Dispatch the items in a list into two target lists. List dispatching is very similar to the [Cull Pattern] component, with the exception that both lists are provided as outputs.



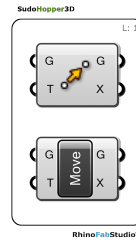
Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.



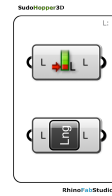


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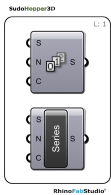
Play Video: Rotate and move a solid in the Z axis



Move: Translate (move) an object along a vector.

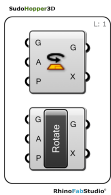
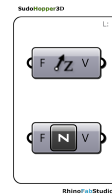


List Length: Measure the length of a list. Elements in a list are identified by their index. The first element is stored at index zero, the second element is stored at index one and so on and so forth. The highest possible index in a list equals the length of the list minus one.

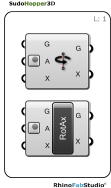


Series: Create a series of numbers. The numbers are spaced according to the {Step} value. If you need to distribute numbers inside a fixed numeric range, consider using the [Range] component instead.

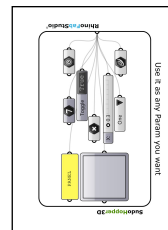
Unit Z: Unit vector parallel to the world {z} axis.



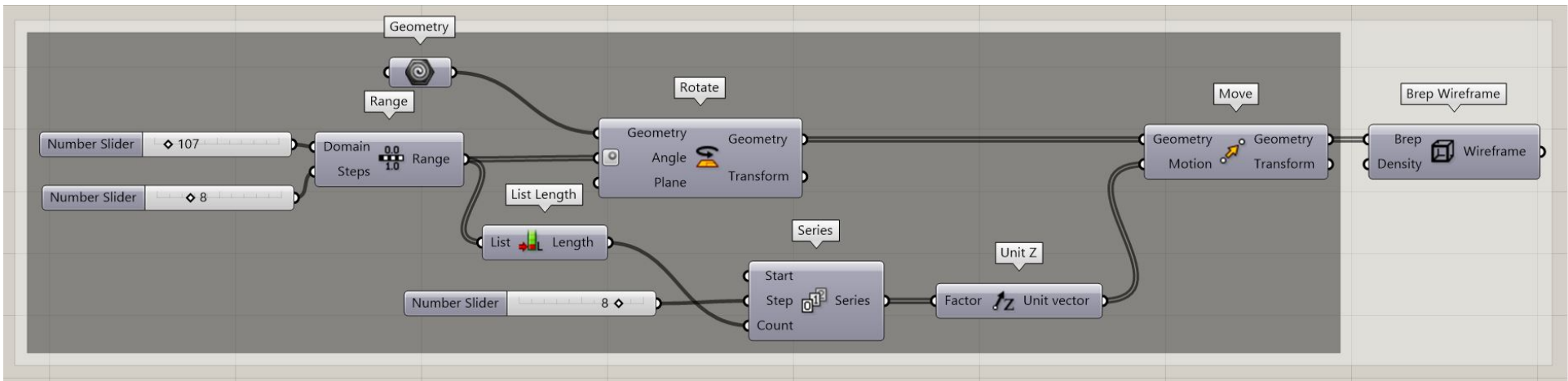
Rotate: Rotate an object in a plane.



Rotate axis: Rotate an object around an axis.



Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.



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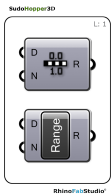
SudoHopper3D

Create both of these lists

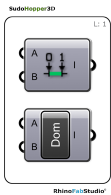
0	0.0	L: 1
45	0.7854	
90	$0.5 * \text{Pi}$	
135	2.35619	
180	Pi	
225	3.92699	
270	$1.5 * \text{Pi}$	
315	5.49779	
360	$2.0 * \text{Pi}$	

RhinoFabStudio

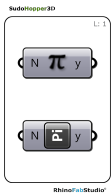
Play Video: Create these two list of numbers



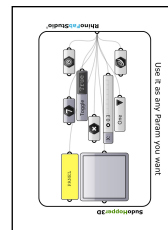
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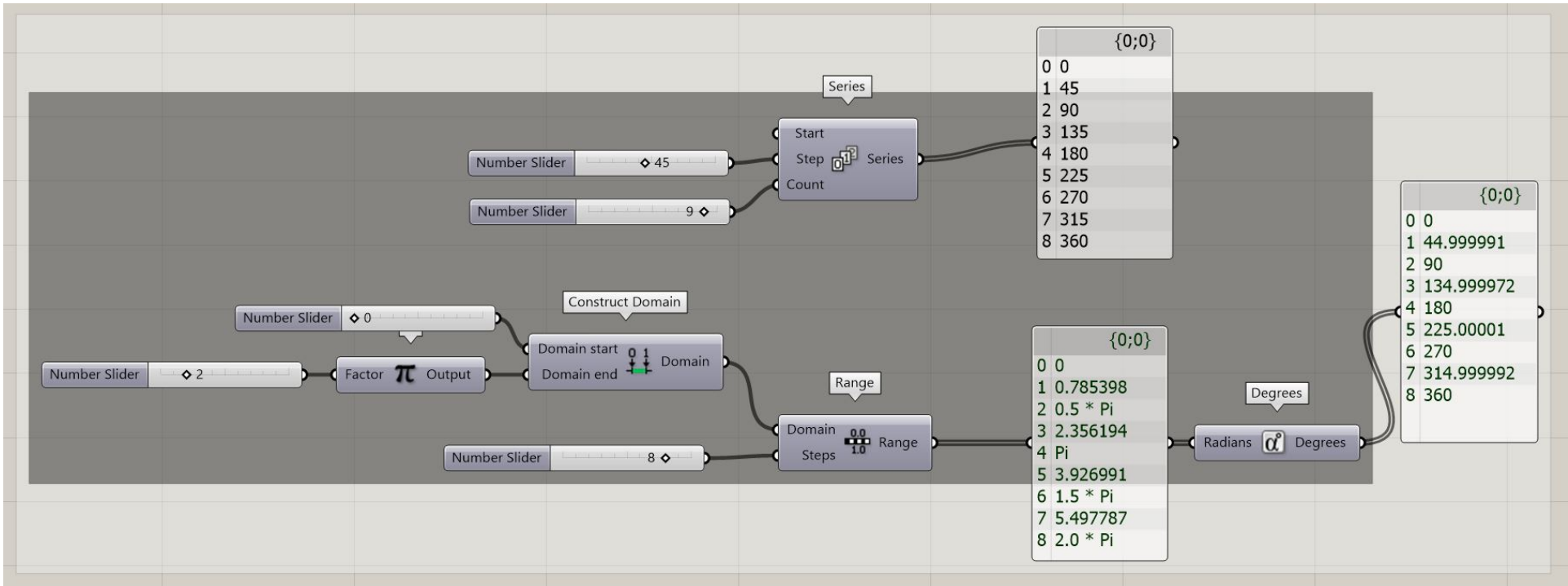
Construct Domain: Create a numeric domain from two numeric extremes.



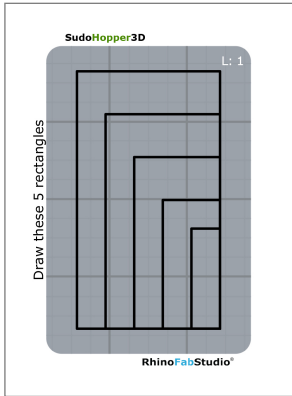
Pi: Returns a factor of Pi.



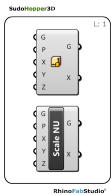
Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.



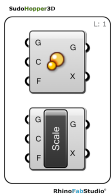
10



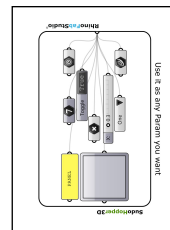
Play Video: Scale a rectangle from its original corner



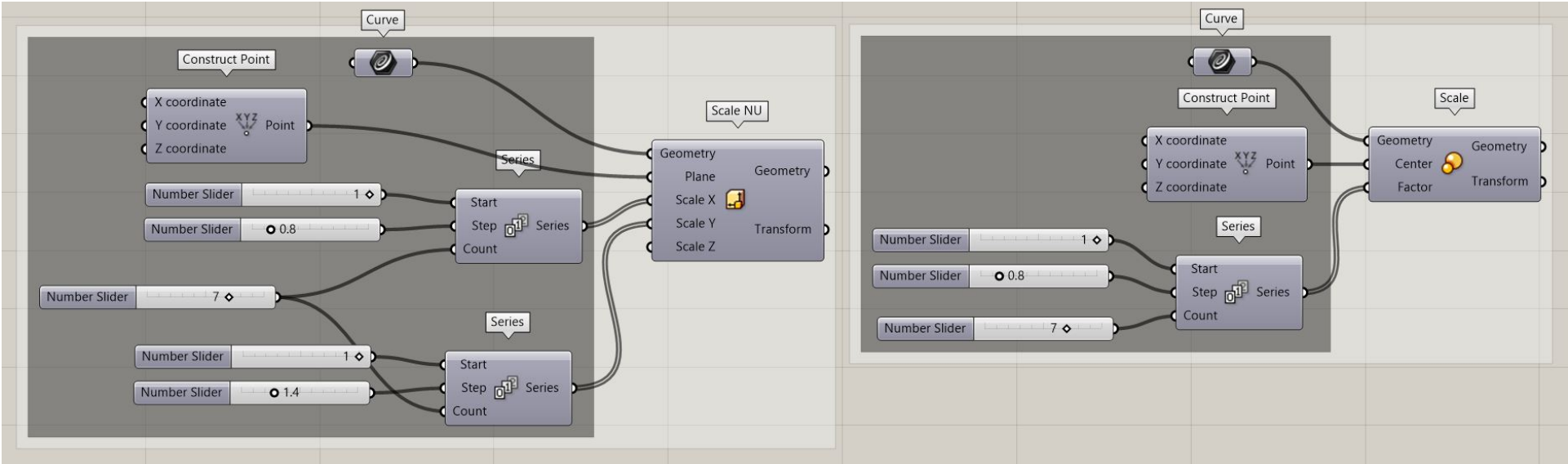
Scale NU: Scale an object with non-uniform factors.

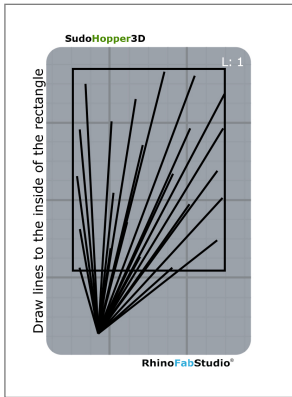


Scale: Scale an object uniformly in all directions.

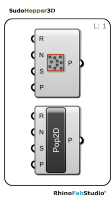


Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.

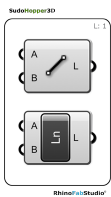




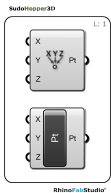
Play Video: Draw random lines from a single point to many points



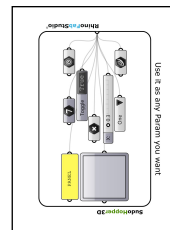
Populate: Populate a 2-Dimensional region with points



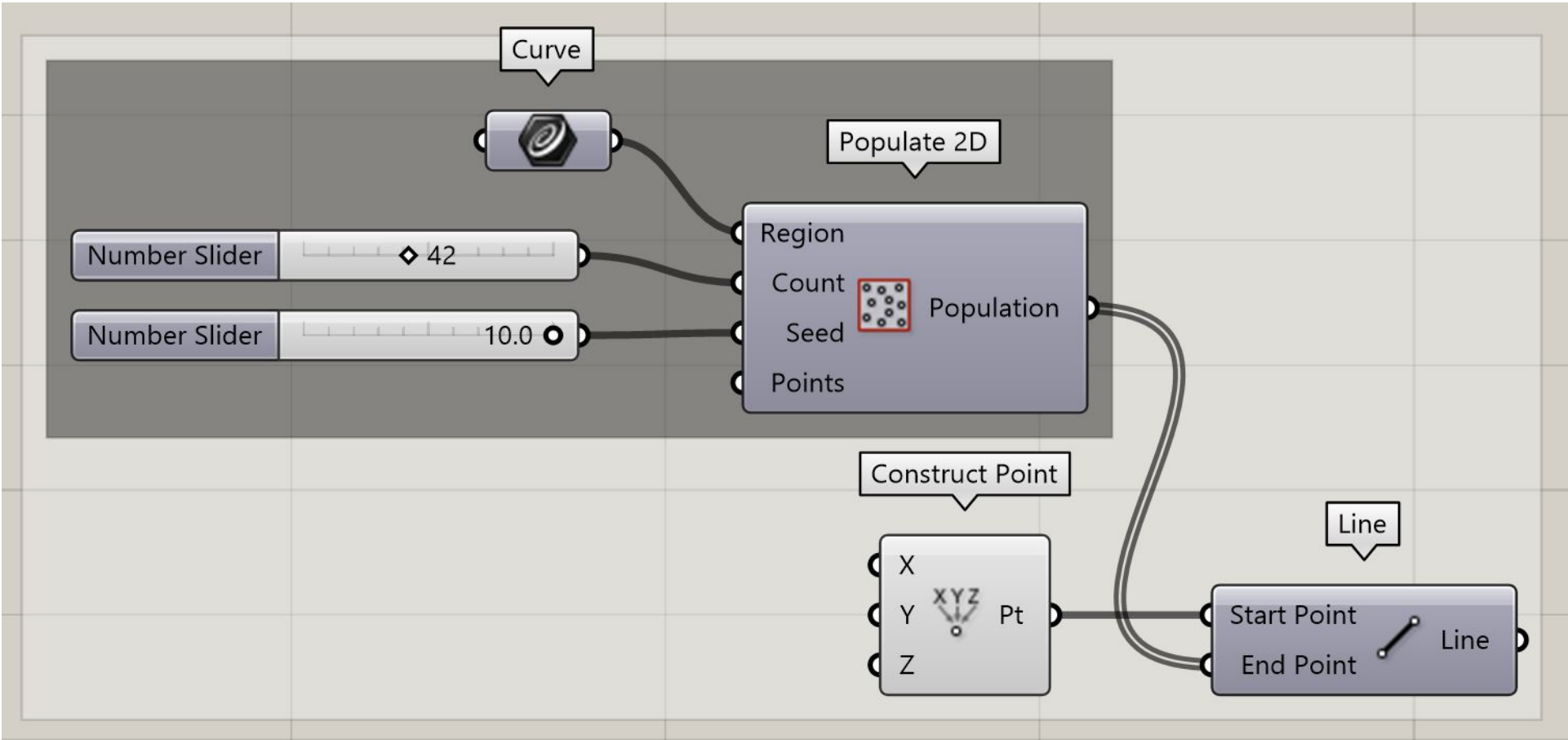
Line: Create a line between two points.

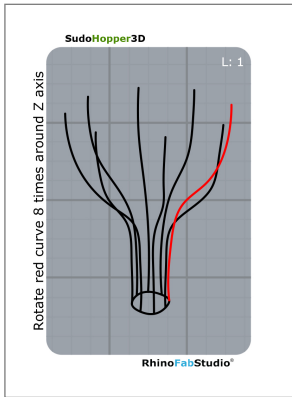


Construct Point: Construct a point from {xyz} coordinates.

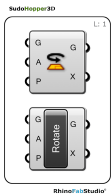


Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.

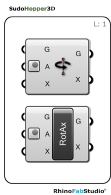




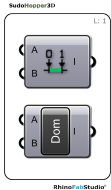
Play Video: Rotate a 2D cross section around an axis few times



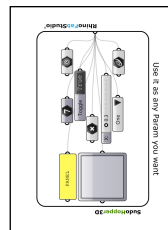
Rotate: Rotate an object in a plane.



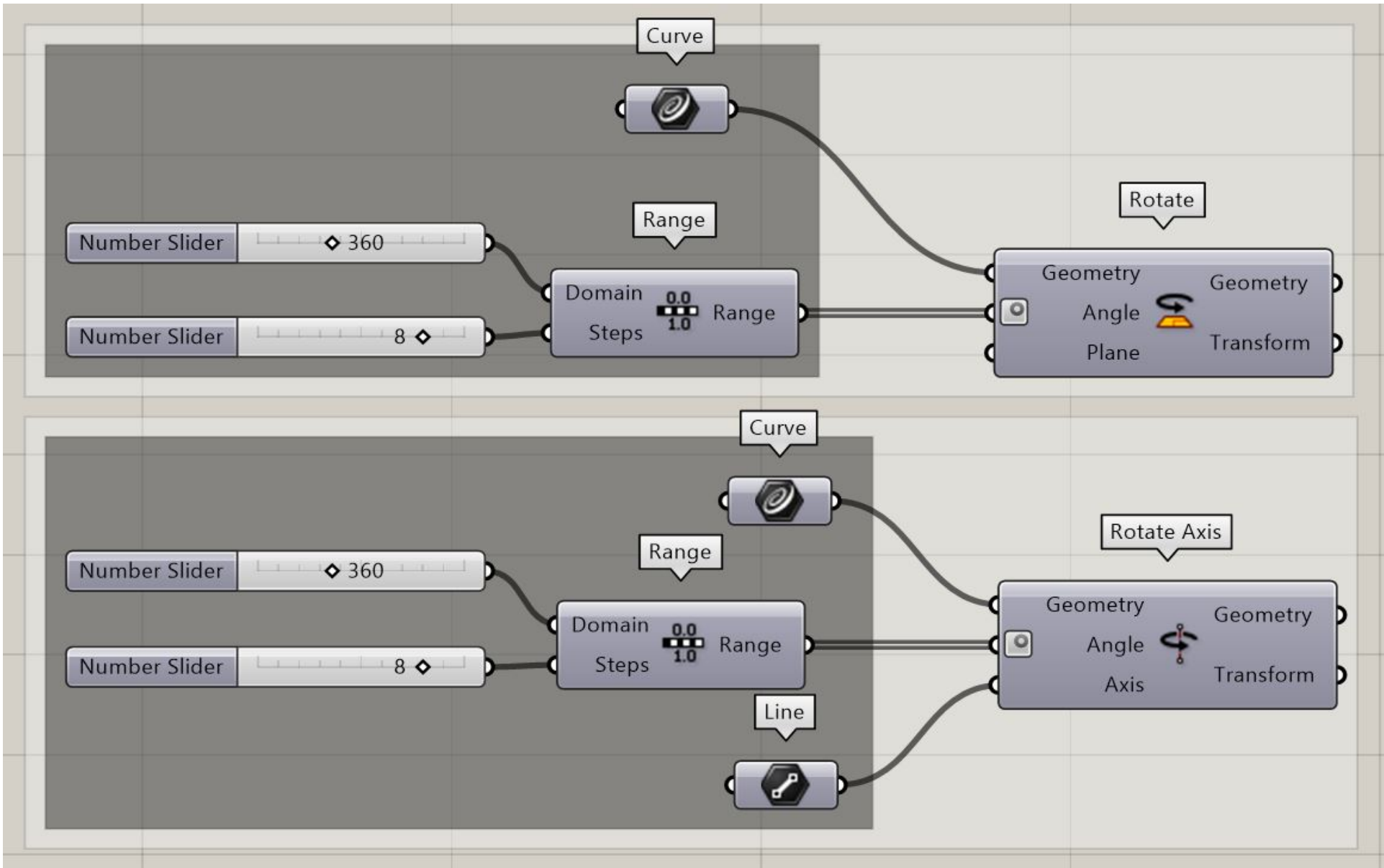
Rotate: Rotate an object around an axis.



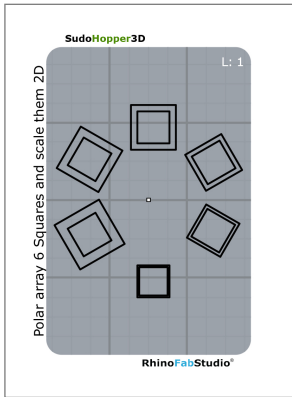
Domain: Create a numeric domain from two numeric extremes.



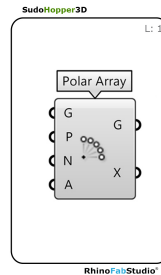
Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.



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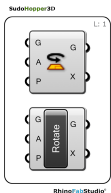
Play Video: Polar array a square and scale each one of them



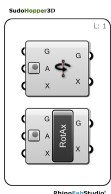
Polar: Create a polar array of geometry.



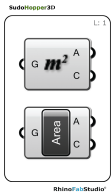
Scale: Scale an object uniformly in all directions.



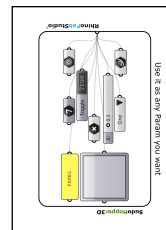
Rotate: Rotate an object in a plane.



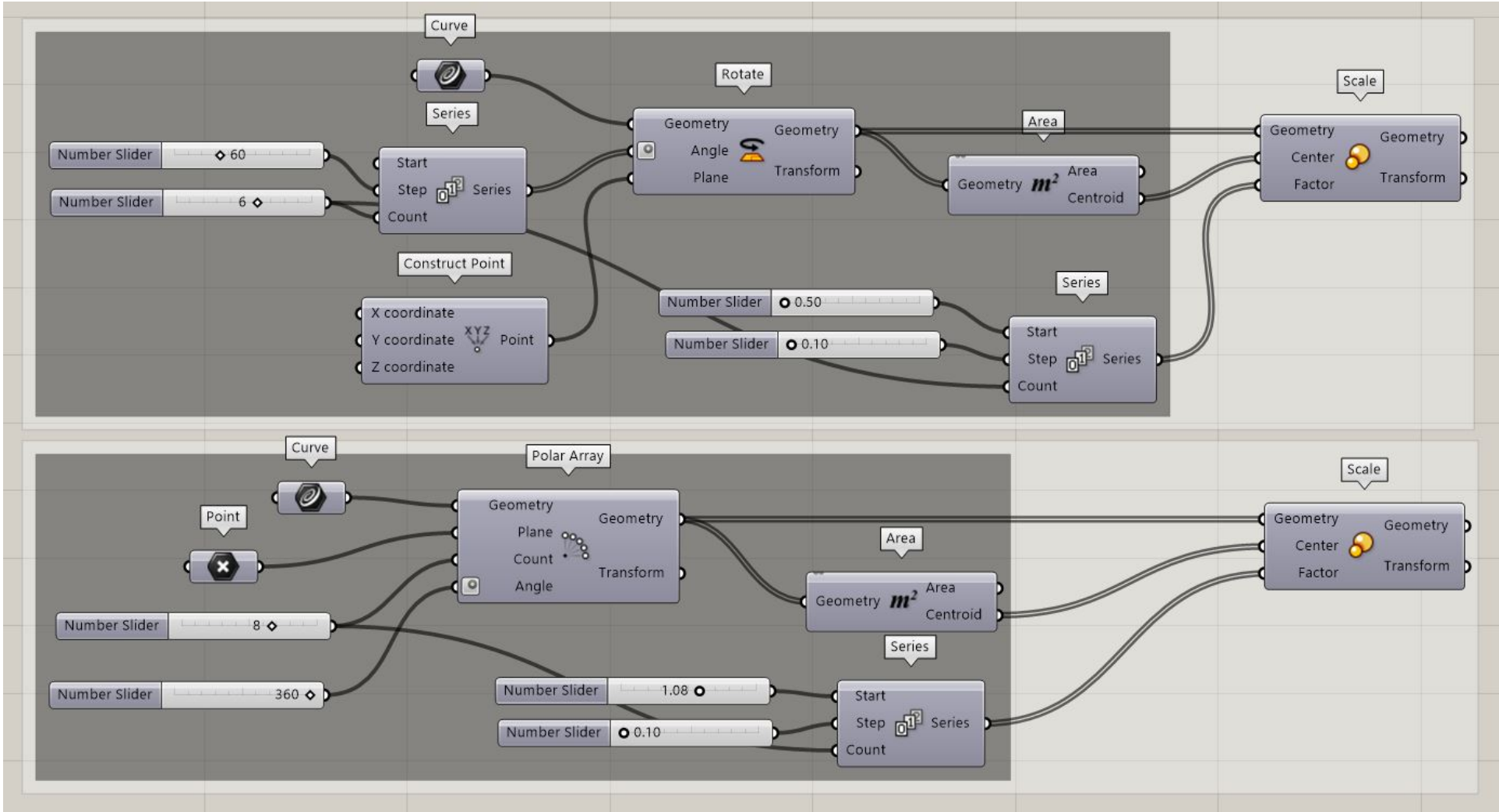
Rotate: Rotate an object in a plane.



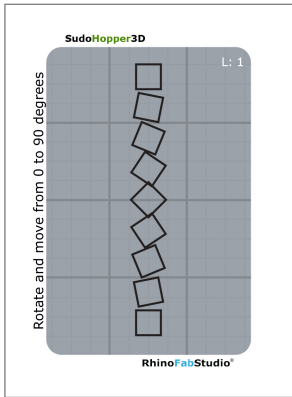
Area: Solve area properties for breps, meshes and planar closed curves.



Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.

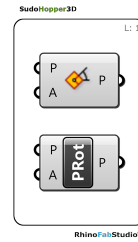


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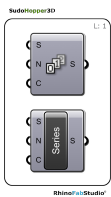
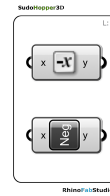


Play Video: Move, copy and rotate along the X or Y axis

Rotate Plane: Perform plane rotation around plane z-axis

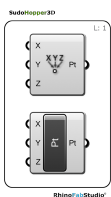
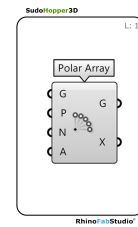


Negative: Compute the negative of a value.



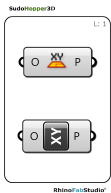
Series: Create a series of numbers. The numbers are spaced according to the {Step} value. If you need to distribute numbers inside a fixed numeric range, consider using the [Range] component instead.

Polar: Create a polar array of geometry.



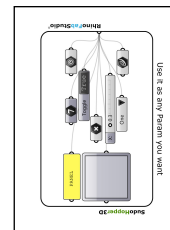
Construct Point: Construct a point from {xyz} coordinates.

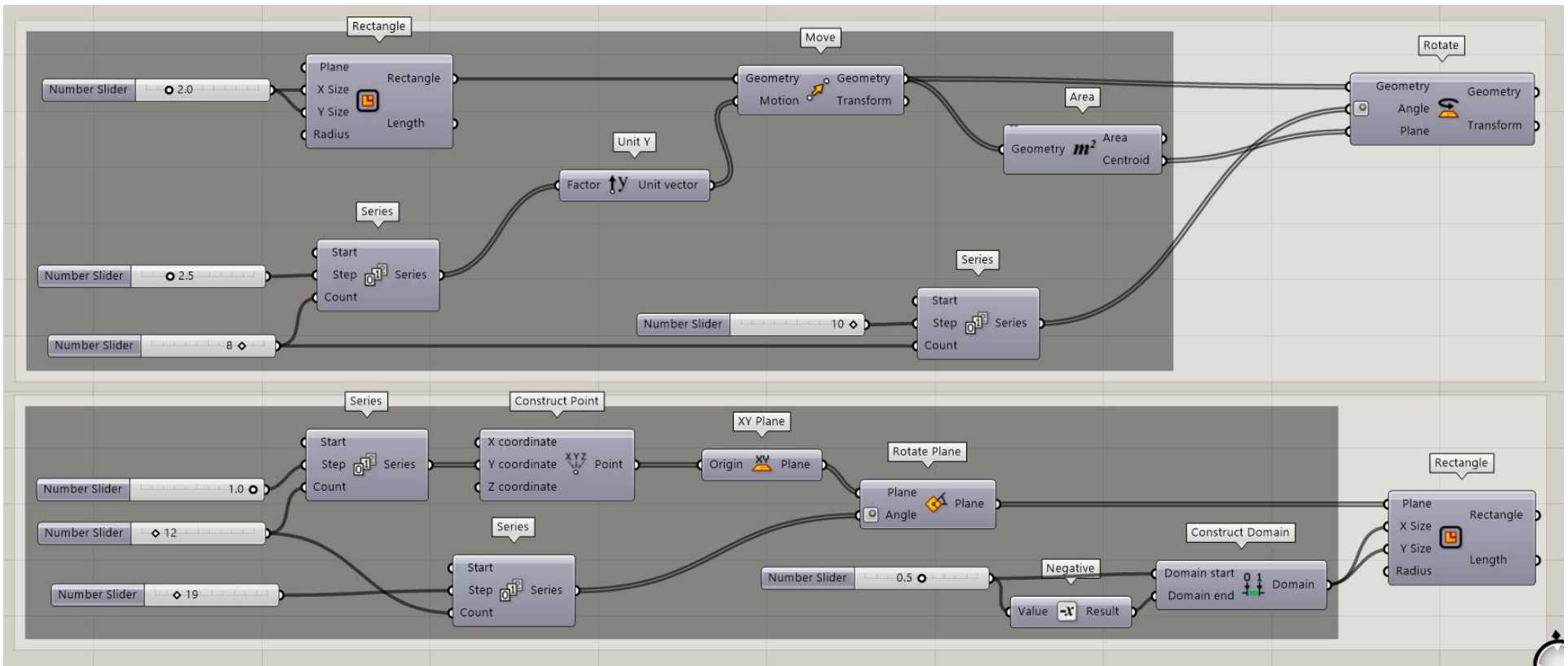
Move: Translate (move) an object along a vector.



XY Plane: World XY plane.

Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.





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SudoHopper3D

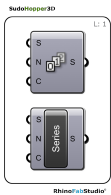
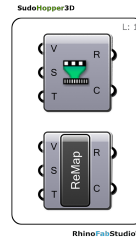
From the first list, create the second list

0	0.0
1	0.062
2	0.125
3	0.187
4	0.25
5	0.312
6	0.375
7	0.437
8	0.5

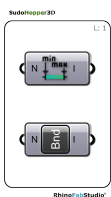
RhinoFabStudio

Play Video: Remap numbers

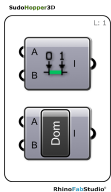
Remap: Remap numbers into a new numeric domain



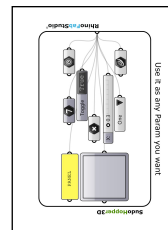
Series: Create a series of numbers. The numbers are spaced according to the {Step} value. If you need to distribute numbers inside a fixed numeric range, consider using the [Range] component instead.



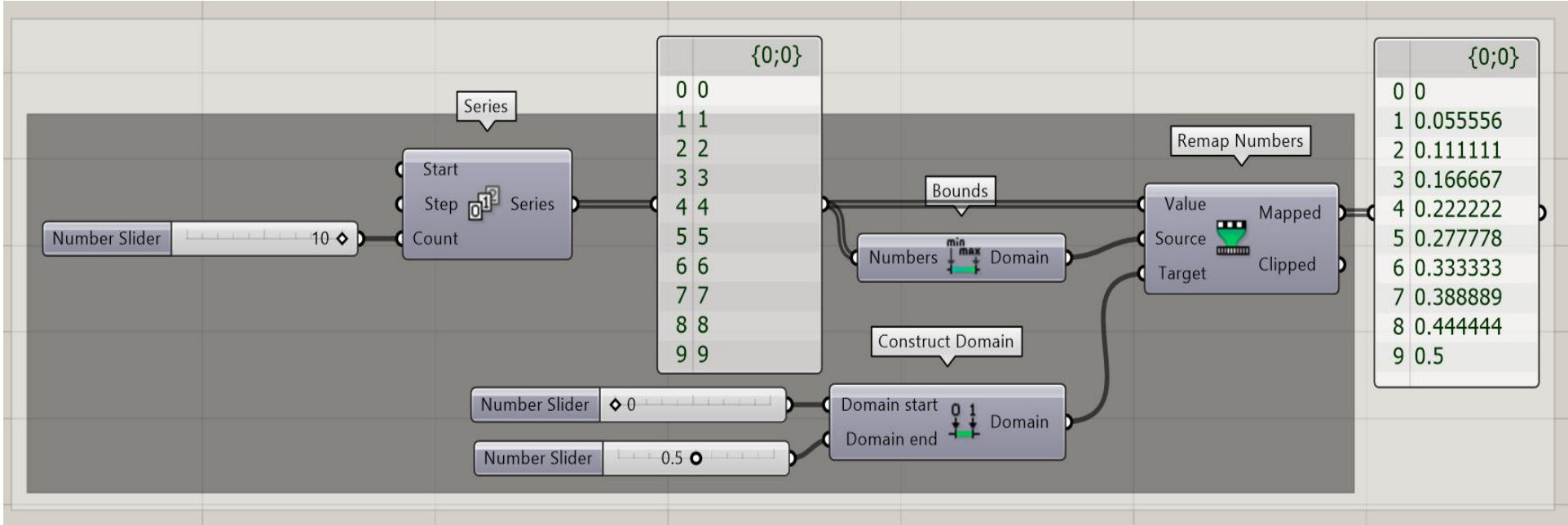
Bounds: Create a numeric domain which encompasses a list of numbers.



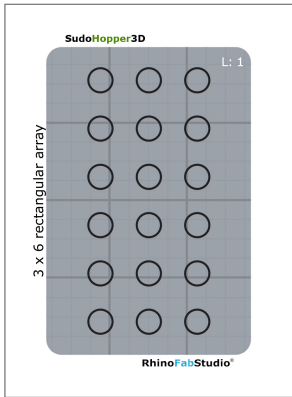
Domain: Create a numeric domain from two numeric extremes.



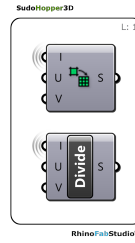
Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.



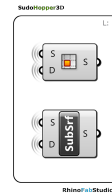
16



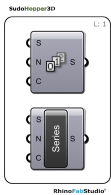
Play Video: Rectangular array of circles



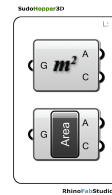
Divide Domain: Divides a two dimensional domain into equal segments



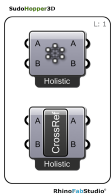
Isotrim: Extract an isoparametric subset of a surface



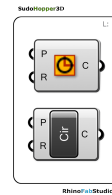
Series: Create a series of numbers. The numbers are spaced according to the {Step} value. If you need to distribute numbers inside a fixed numeric range, consider using the [Range] component instead.



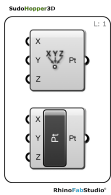
Area: Solve area properties for breps, meshes and planar closed curves.



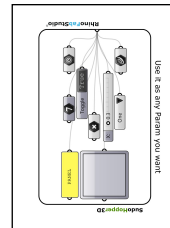
Range: Create a range of numbers. The numbers are spaced equally inside a numeric domain. Use this component if you need to create numbers between extremes. If you need control over the interval between successive numbers, you should be using the [Series] component.



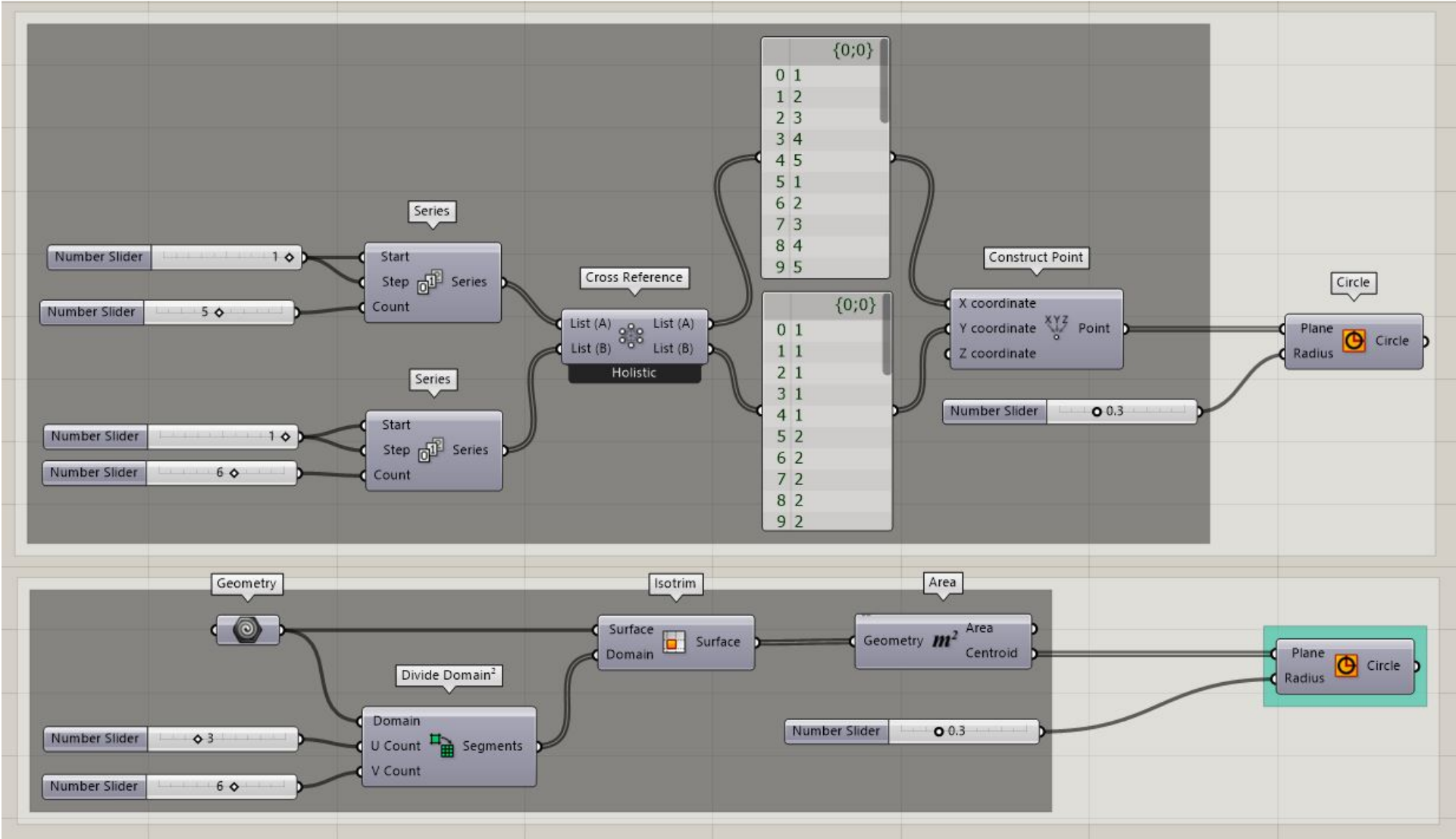
Circle: Create a circle defined by base plane and radius.



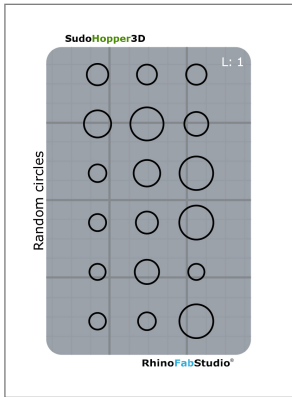
Construct Point: Construct a point from {xyz} coordinates.



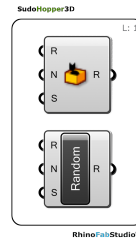
Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.



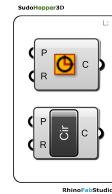
17



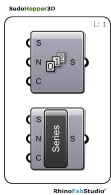
Play Video: Draw circles with random radii



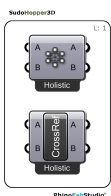
Random: Generate a list of pseudo random numbers. The number sequence is unique but stable for each seed value. If you do not like a random distribution, try different seed values.



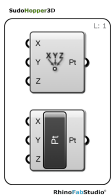
Circle: Create a circle defined by base plane and radius.



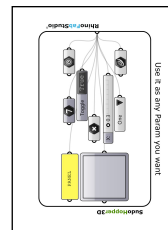
Series: Create a series of numbers. The numbers are spaced according to the {Step} value. If you need to distribute numbers inside a fixed numeric range, consider using the [Range] component instead.



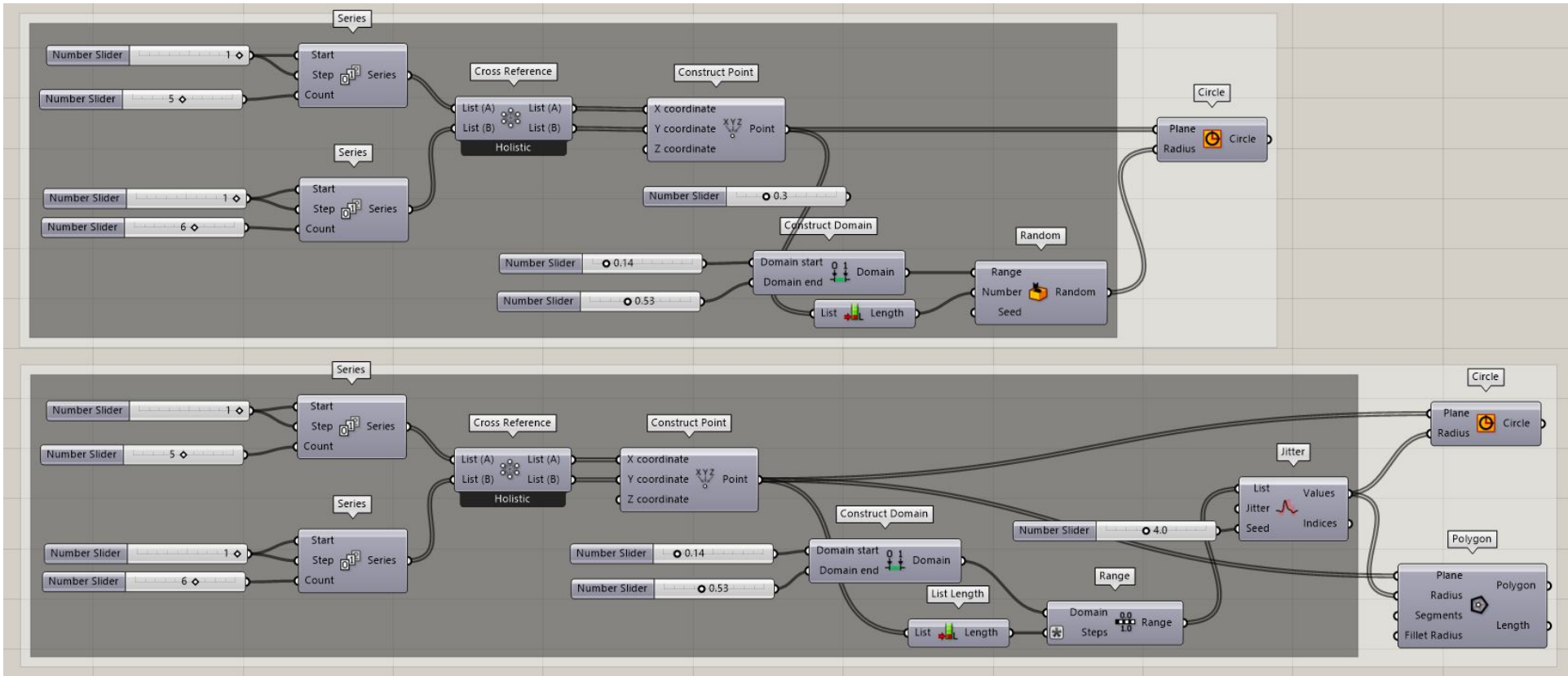
Range: Create a range of numbers. The numbers are spaced equally inside a numeric domain. Use this component if you need to create numbers between extremes. If you need control over the interval between successive numbers, you should be using the [Series] component.



Construct Point: Construct a point from {xyz} coordinates.



Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.



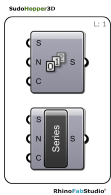
SudoHopper3D

Create both lists of numbers, black & red

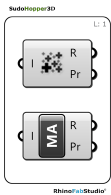
2	2	L: 1
4	6	
6	12	
8	20	
10	30	
12	42	
14	56	
16	72	
18	90	

RhinoFabStudio

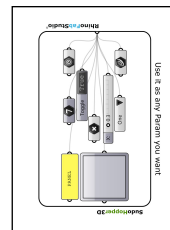
Play Video: Create these two lists of numbers



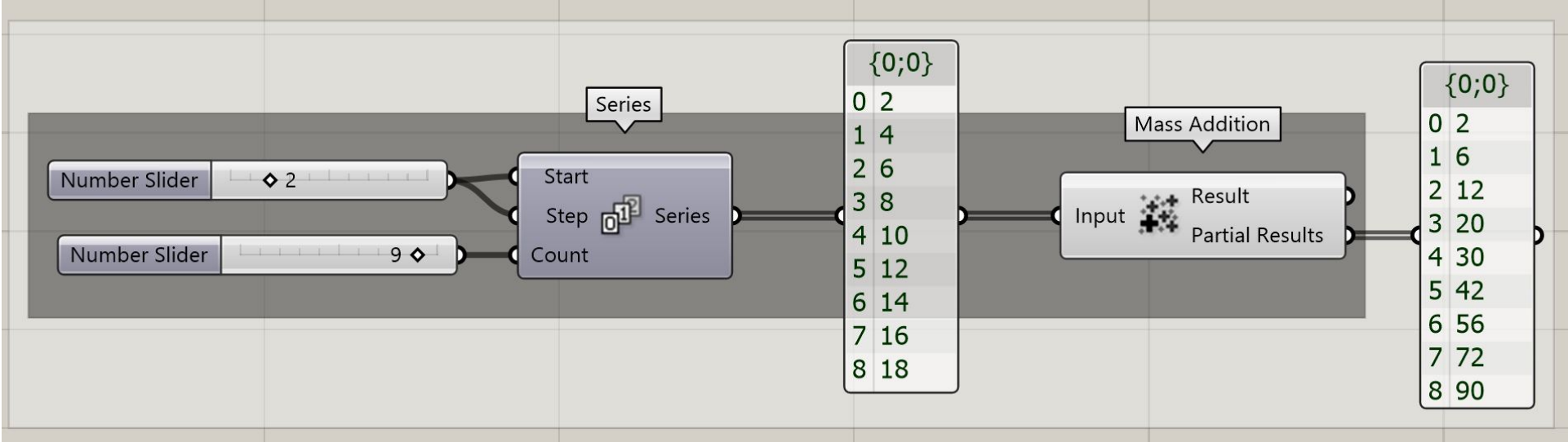
Series: Create a series of numbers. The numbers are spaced according to the {Step} value. If you need to distribute numbers inside a fixed numeric range, consider using the [Range] component instead.



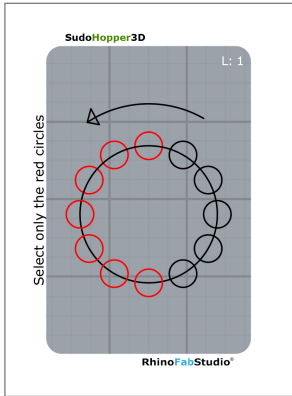
Mass: Perform mass addition of a list of items



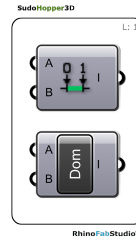
Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.



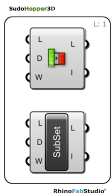
19



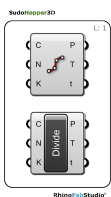
Play Video: Select only the red circles



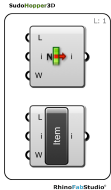
Domain: Create a numeric domain from two numeric extremes.



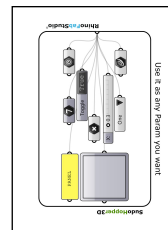
Sub List: Extract a subset from a list. Elements in a list are identified by their index. The first element is stored at index zero, the second element is stored at index one and so on and so forth. The subset allows you to copy a continuous range of elements as a new list.



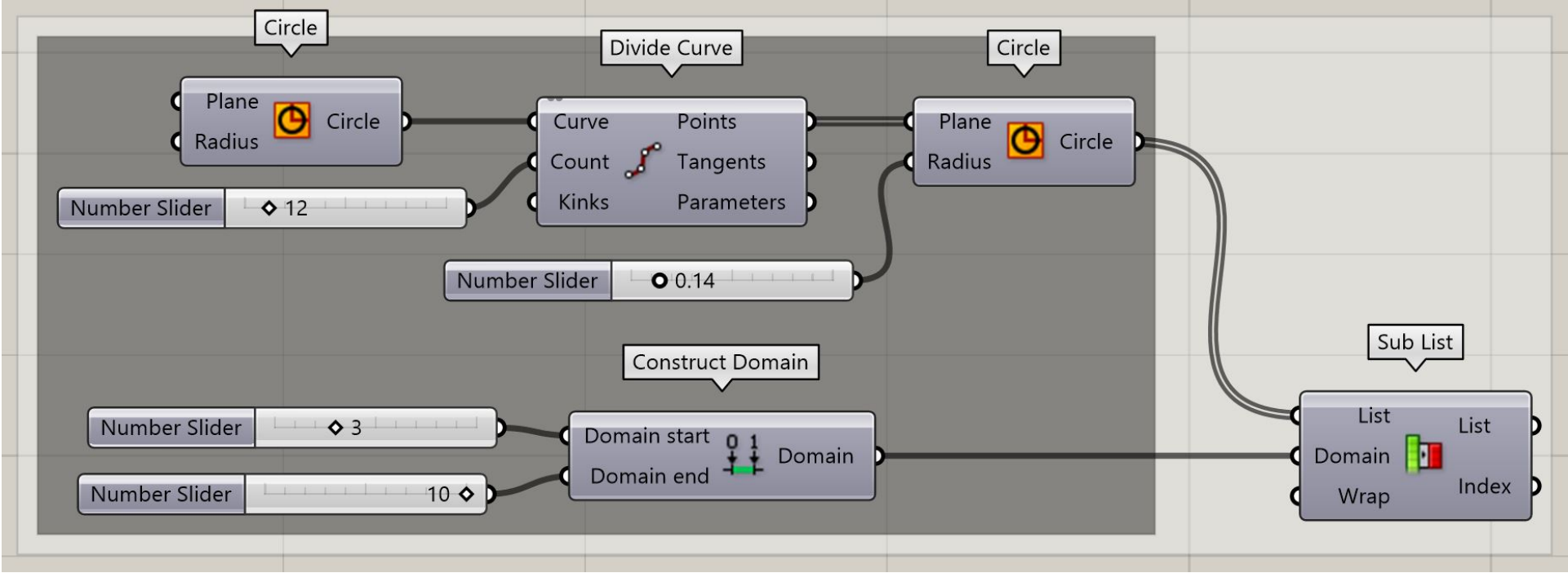
Divide: Divide a curve into equal length segments



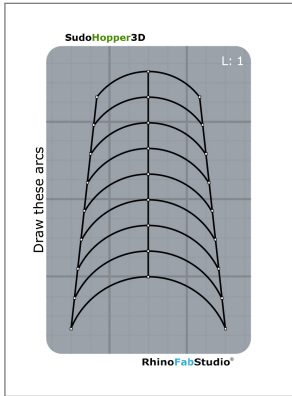
List Item: Retrieve a specific item from a list.



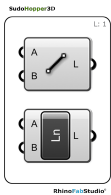
Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.



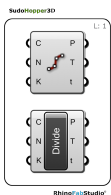
20



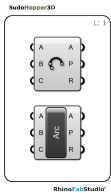
Play Video: Draw these arcs from these three lines



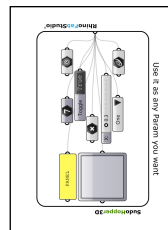
Line: Create a line between two points.



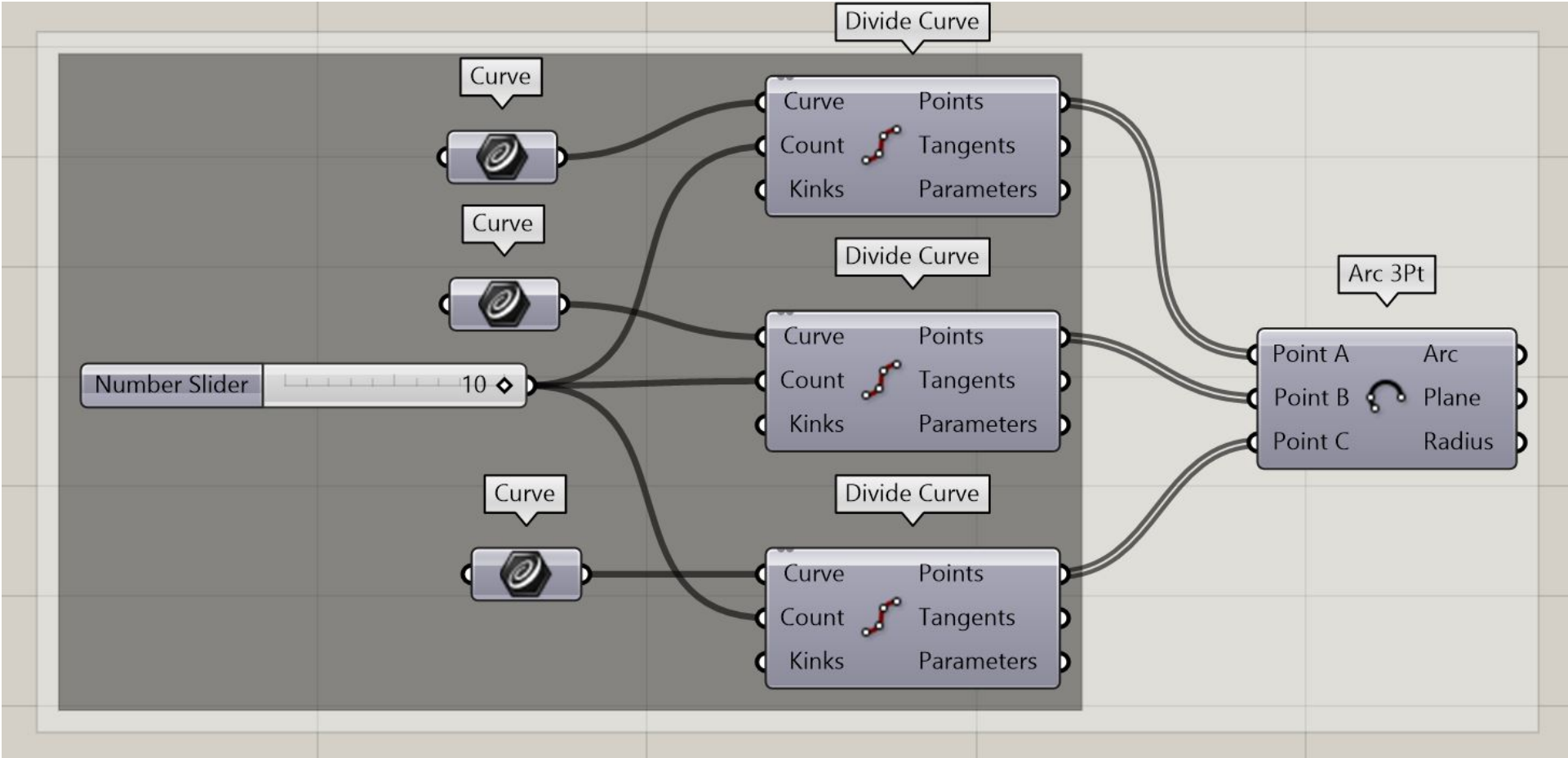
Divide: Divide a curve into equal length segments



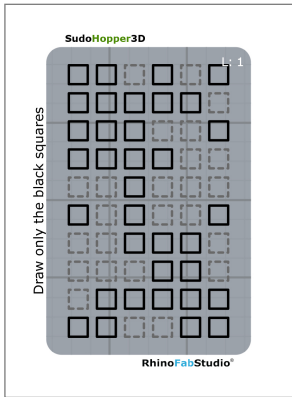
Arc 3Pt: Create an arc through three points.



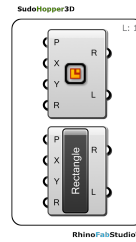
Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.



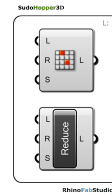
21



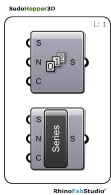
Play Video: Random reduce few rectangles



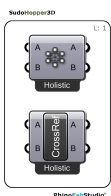
Rectangle: Create a rectangle on a plane



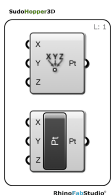
Random Reduce: Randomly remove N items from a list



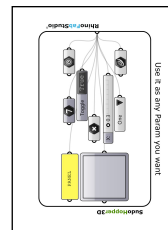
Series: Create a series of numbers. The numbers are spaced according to the {Step} value. If you need to distribute numbers inside a fixed numeric range, consider using the [Range] component instead.



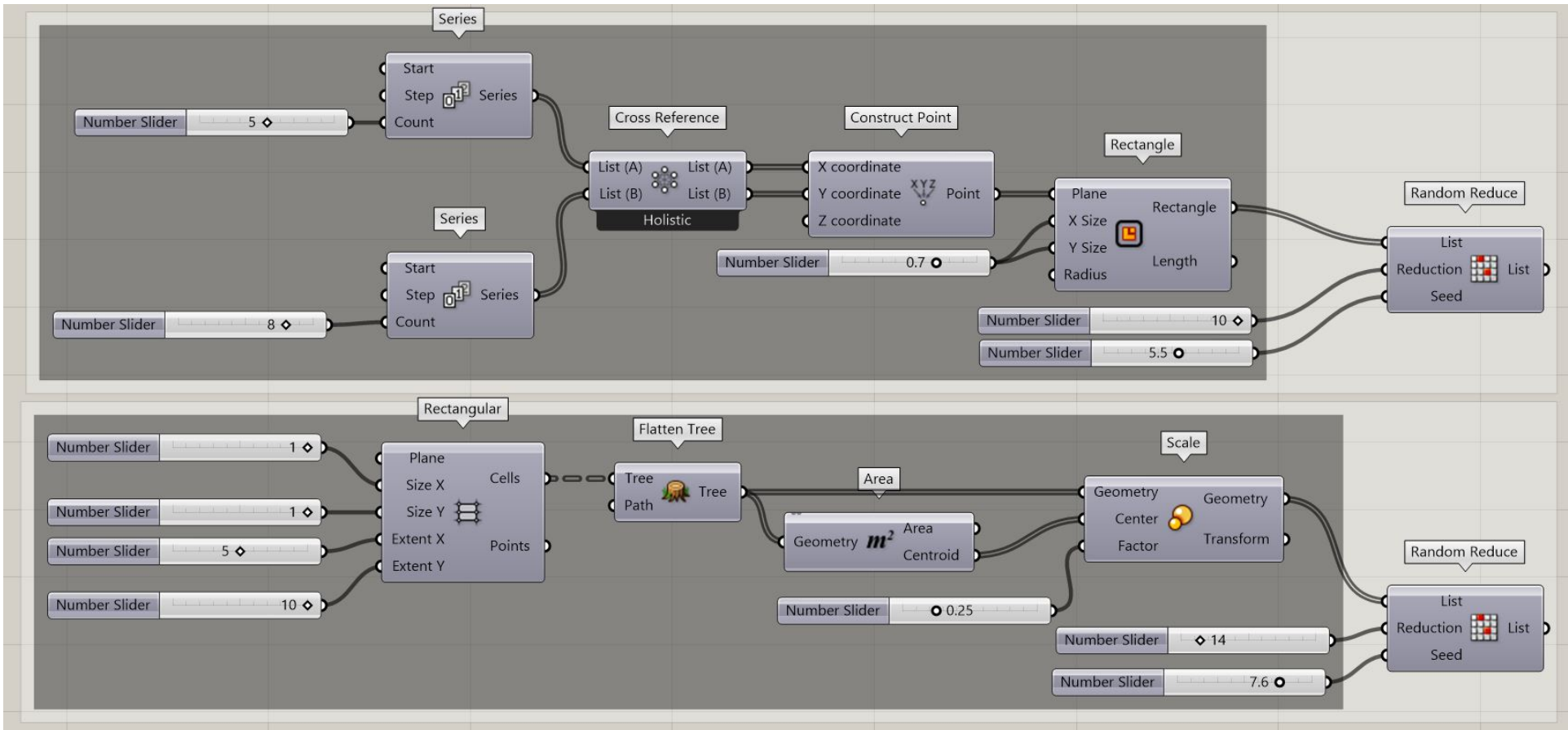
Range: Create a range of numbers. The numbers are spaced equally inside a numeric domain. Use this component if you need to create numbers between extremes. If you need control over the interval between successive numbers, you should be using the [Series] component.



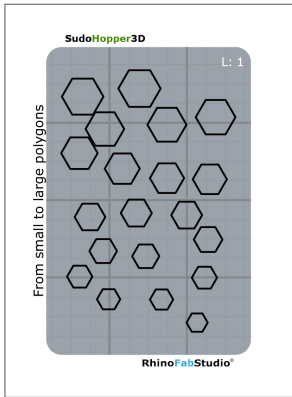
Construct Point: Construct a point from {xyz} coordinates.



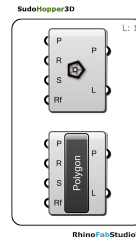
Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.



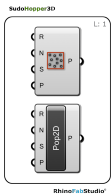
22



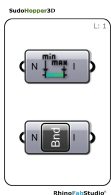
Play Video: Draw few polygons from small to large in the Y direction



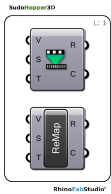
Polygon: Create a polygon with optional round edges.



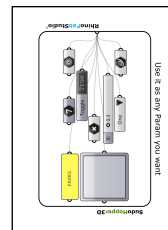
Populate 2D: Populate a 2-Dimensional region with points



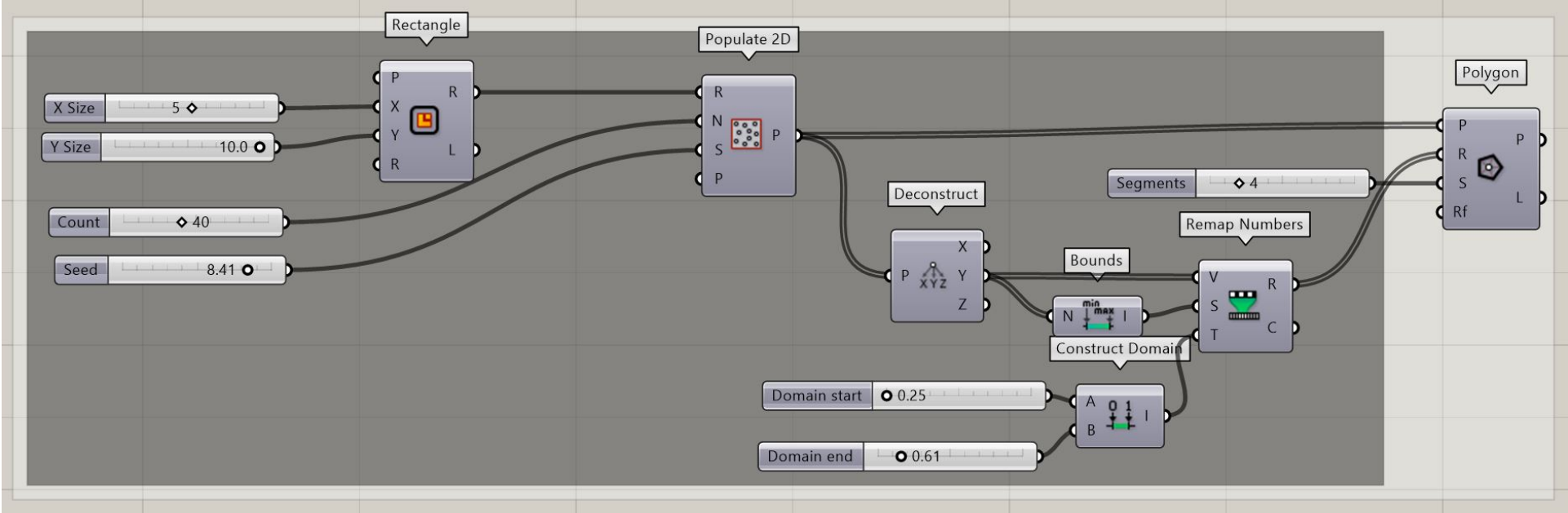
Bounds: Create a numeric domain which encompasses a list of numbers.



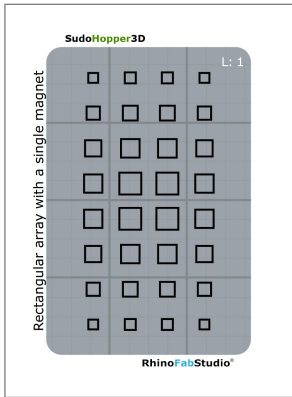
Remap Numbers: Remap numbers into a new numeric domain



Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.

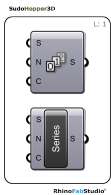
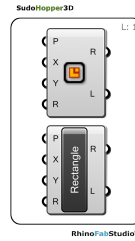


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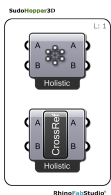


Play Video: Rectangular array, with a single magnet

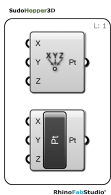
Rectangle: Create a rectangle on a plane



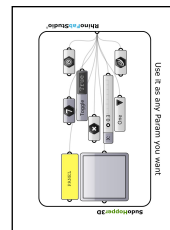
Series: Create a series of numbers. The numbers are spaced according to the {Step} value. If you need to distribute numbers inside a fixed numeric range, consider using the [Range] component instead.



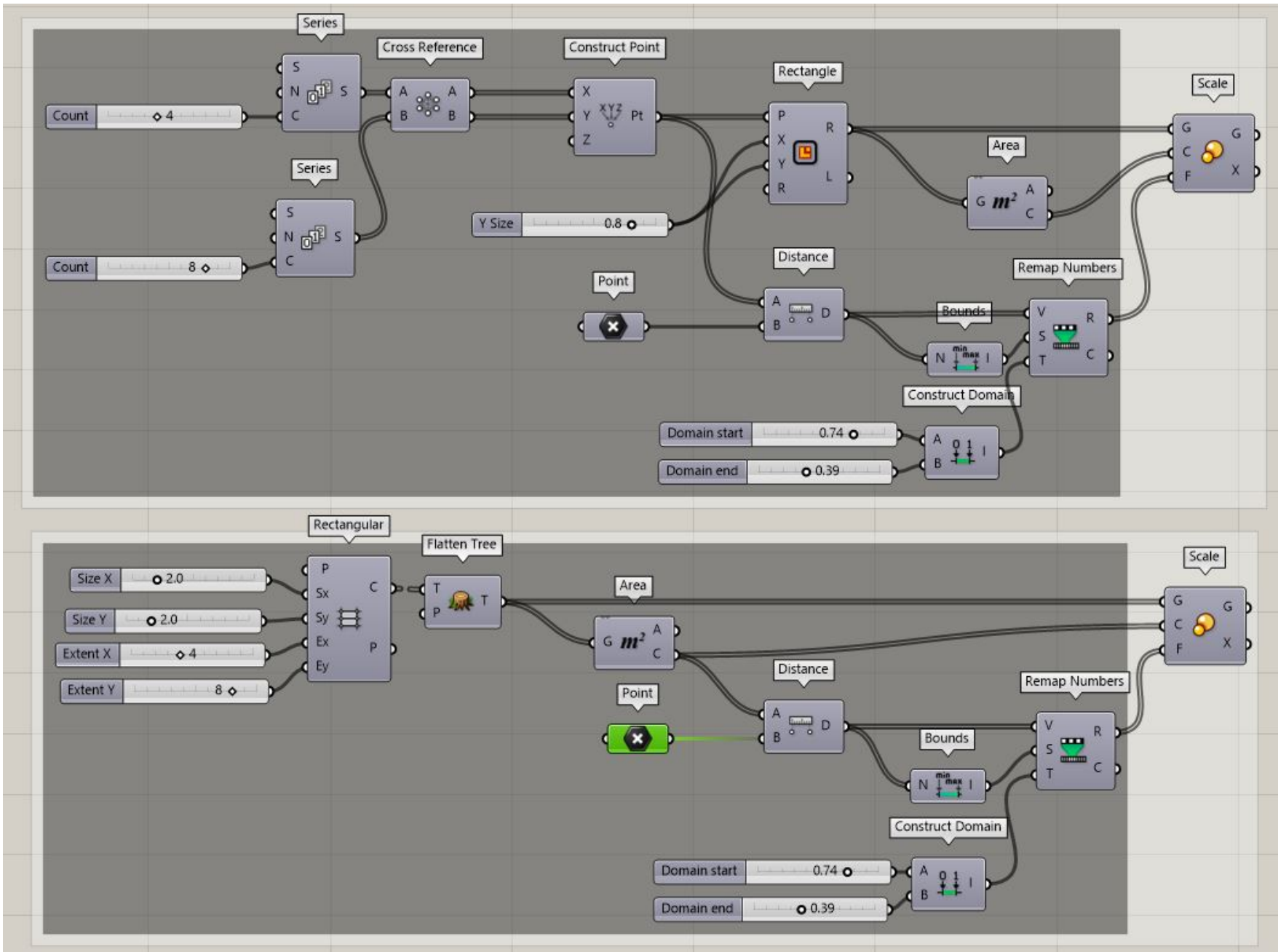
Range: Create a range of numbers. The numbers are spaced equally inside a numeric domain. Use this component if you need to create numbers between extremes. If you need control over the interval between successive numbers, you should be using the [Series] component.



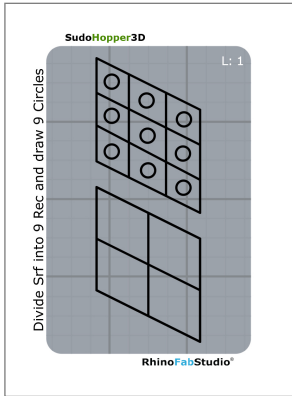
Construct Point: Construct a point from {xyz} coordinates.



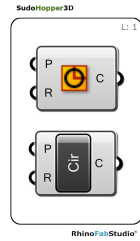
Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.



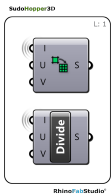
24



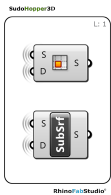
Play Video: Draw 9 or more circles on top of a flat surface



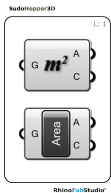
Circle: Create a circle defined by base plane and radius.



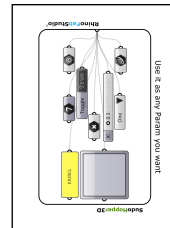
Divide Domain: Divide a two dimensional-domain into equal segments



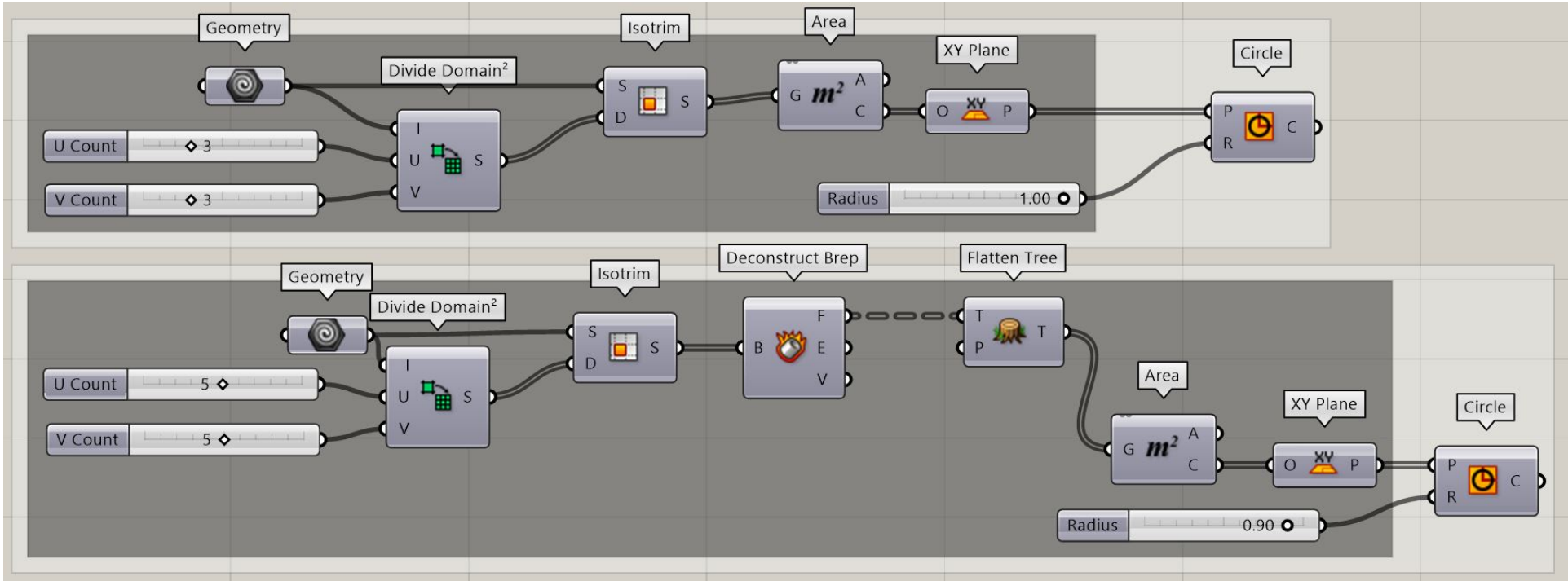
Isotrim: Extract a isoparametric subset of a surface



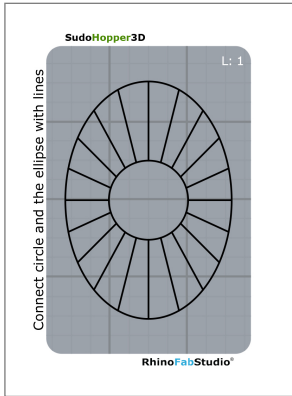
Area: Solve area properties for breps, meshes and planar closed curves.



Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.

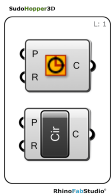
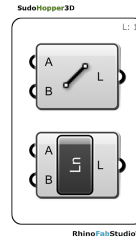


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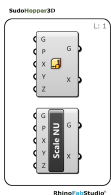


Play Video: Draw an ellipse and a circle, divide both and connect the points

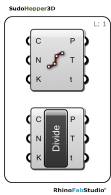
Line: Create a line between two points.



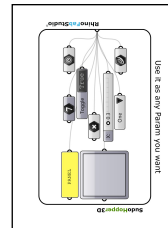
Circle: Create a circle defined by base plane and radius.



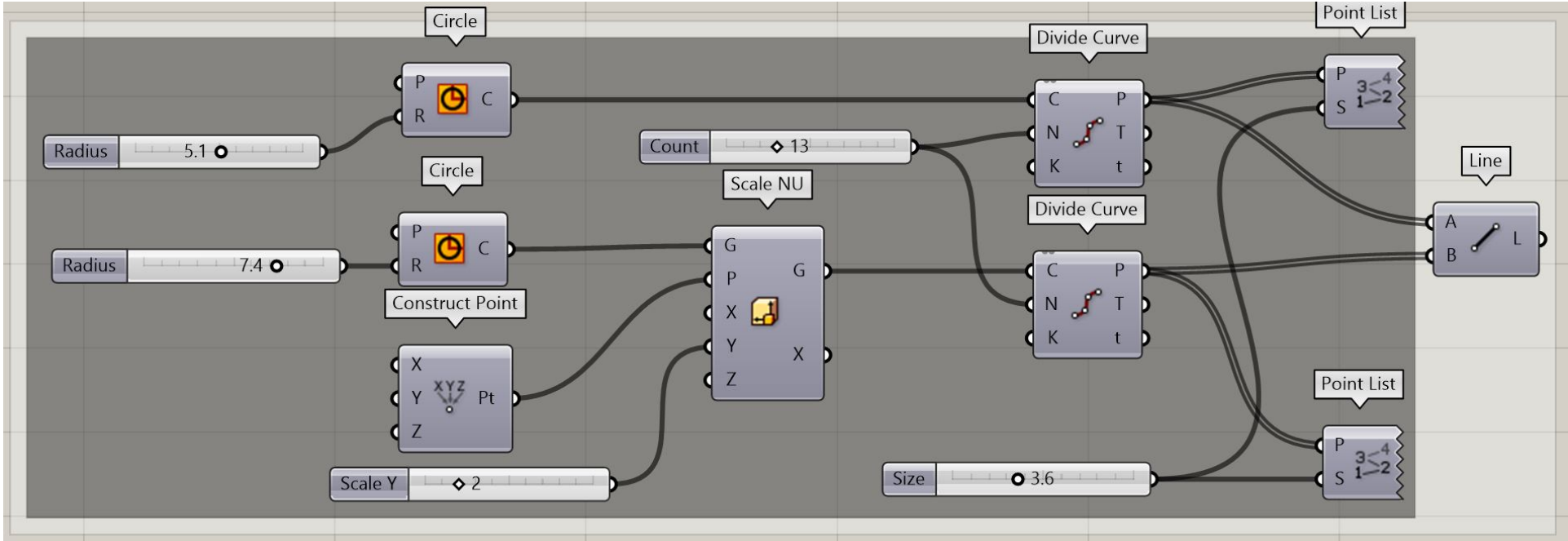
Scale NU: Scale an object with non-uniform factors.



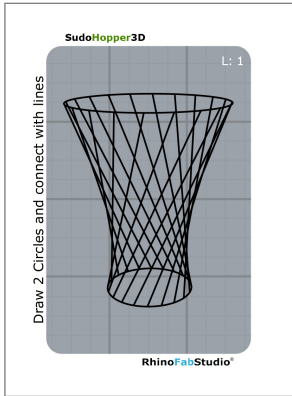
Divide: Divide a curve into equal length segments



Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.

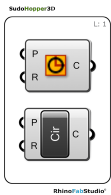
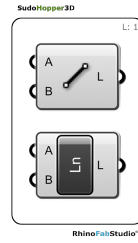


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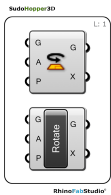


Play Video: Wire frame tower with two circles

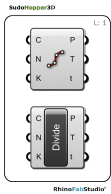
Line: Create a line between two points.



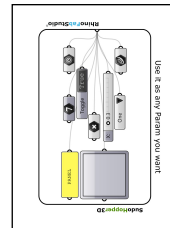
Circle: Create a circle defined by base plane and radius.



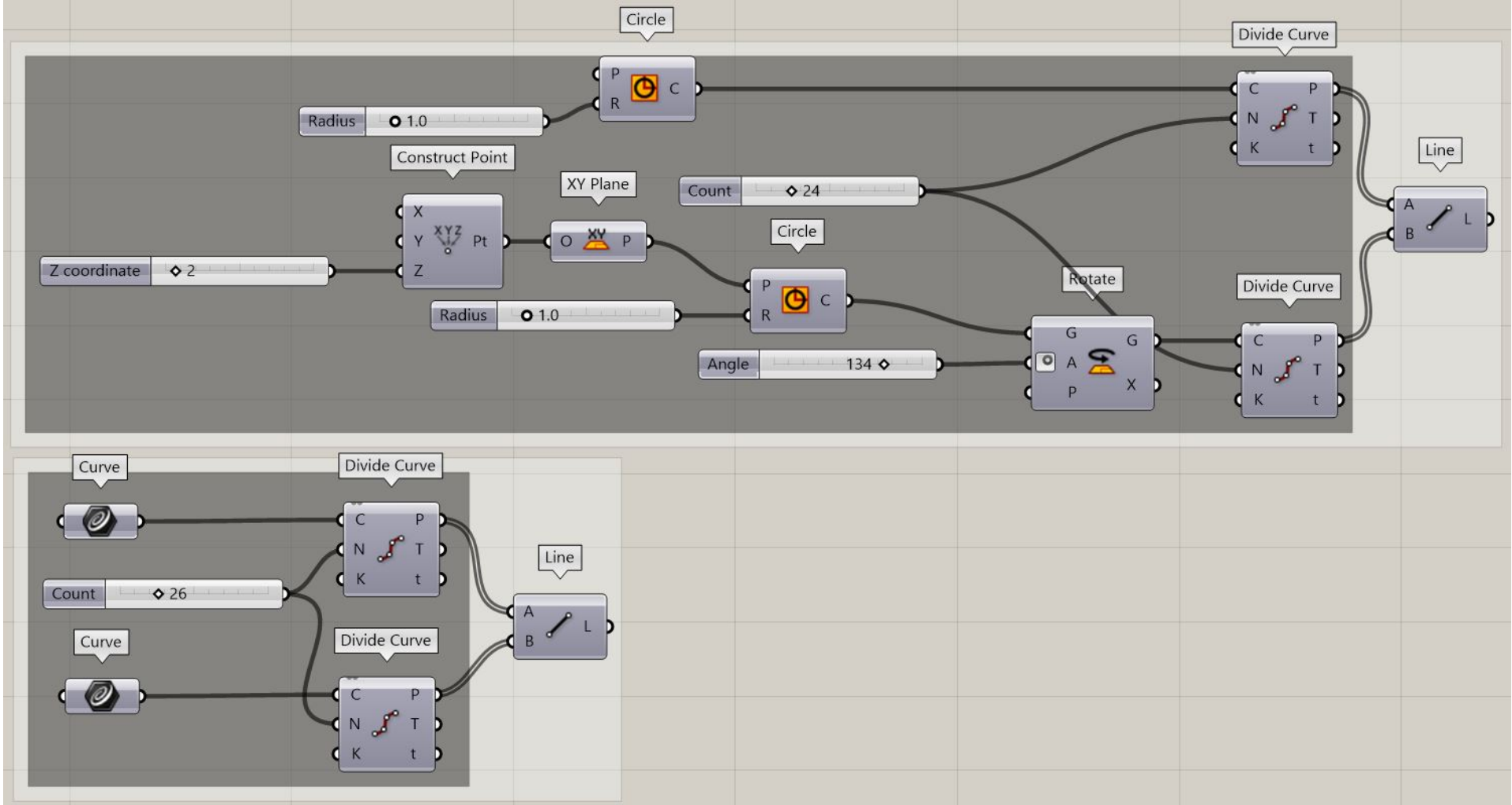
Rotate: Rotate an object in a plane.



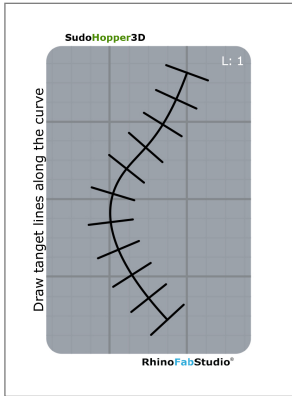
Divide: Divide a curve into equal length segments



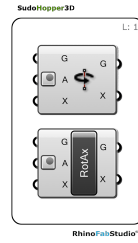
Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.



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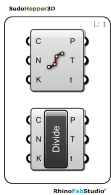
Play Video: Draw curves tangent to the points on the curve



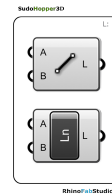
Rotate Axis: Rotate an object around an axis.



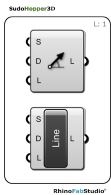
Move: Translate (move) an object along a vector.



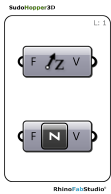
Divide: Divide a curve into equal length segments



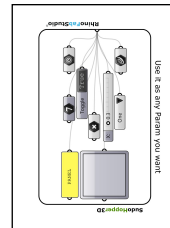
Line: Create a line between two points.



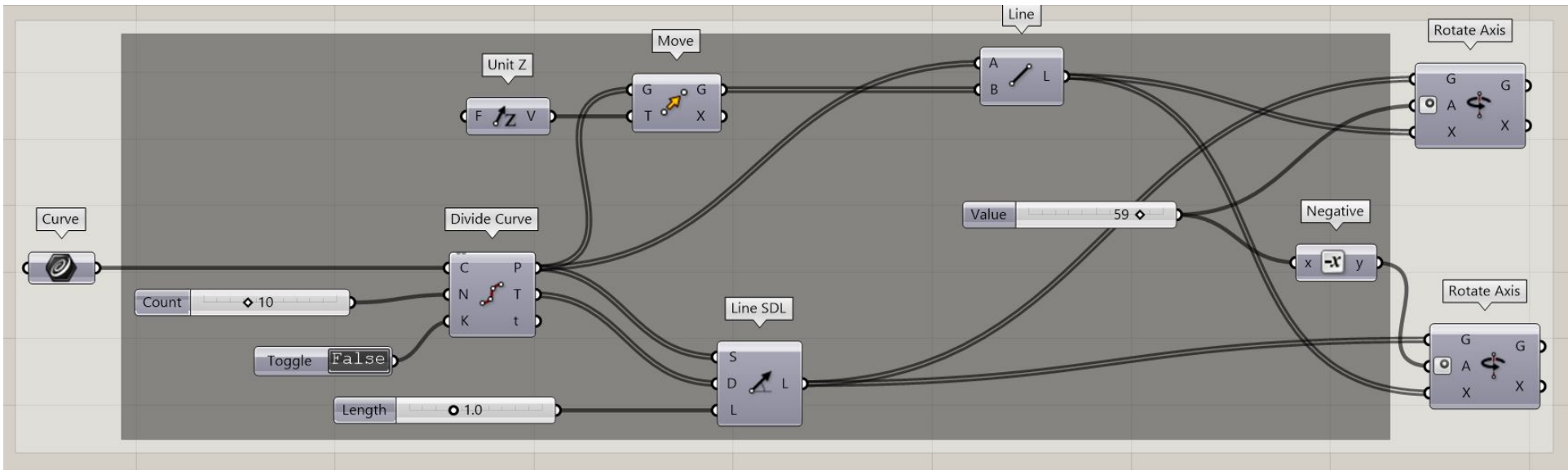
SDL: Create a line segment defined by start point, tangent and length.

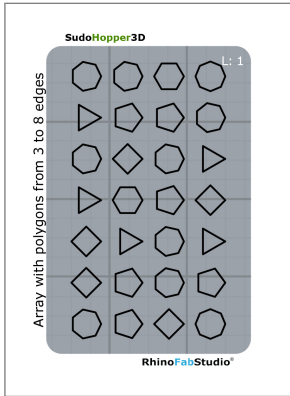


Unit Z: Unit vector parallel to the world {z} axis.



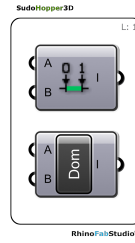
Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.



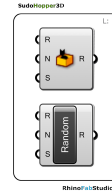


Play Video: Rectangular array with polygons with random number of edges

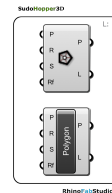
Domain: Create a numeric domain from two numeric extremes.



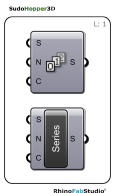
Random: Generate a list of pseudo random numbers. The number sequence is unique but stable for each seed value. If you do not like a random distribution, try different seed values.



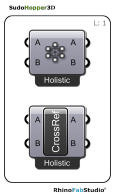
Polygon: Create a polygon with optional round edges.



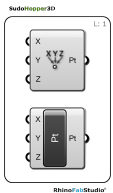
Series: Create a series of numbers. The numbers are spaced according to the {Step} value. If you need to distribute numbers inside a fixed numeric range, consider using the [Range] component instead.



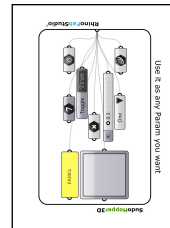
Range: Create a range of numbers. The numbers are spaced equally inside a numeric domain. Use this component if you need to create numbers between extremes. If you need control over the interval between successive numbers, you should be using the [Series] component.

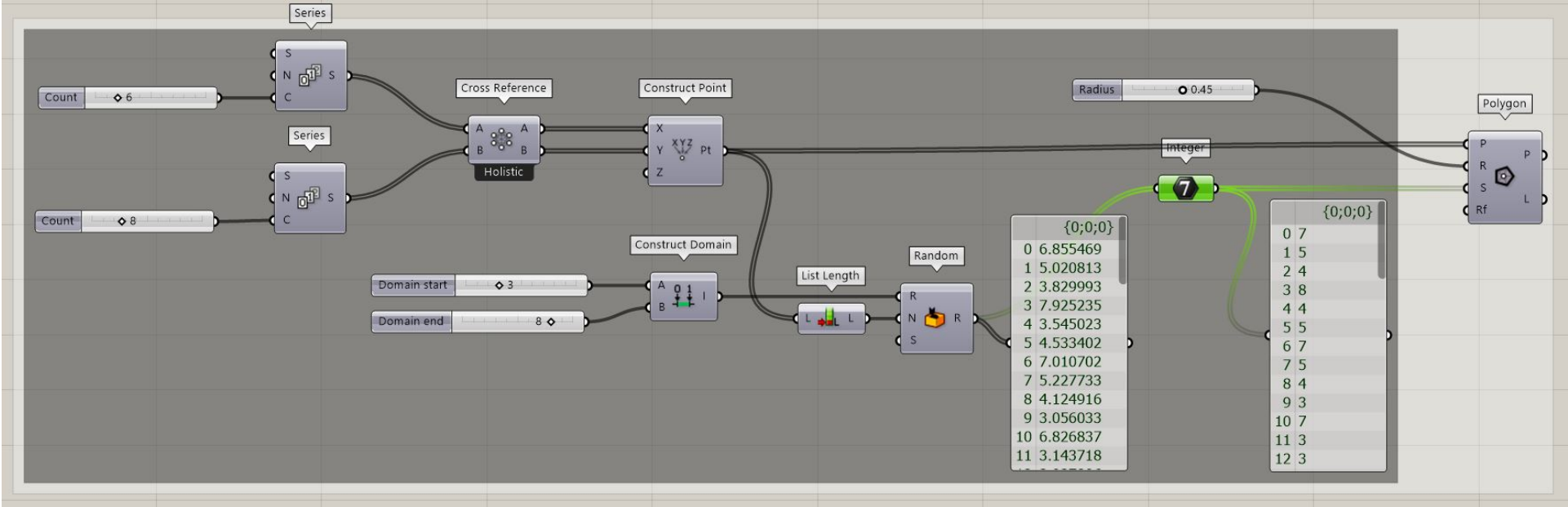


Construct Point: Construct a point from {xyz} coordinates.

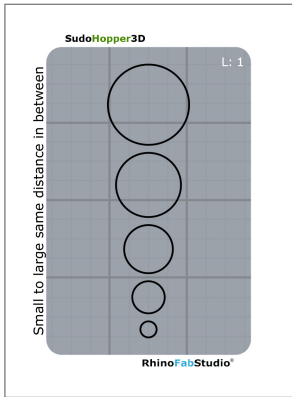


Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.



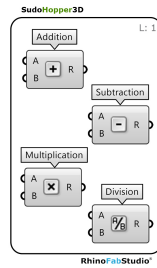


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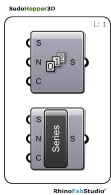
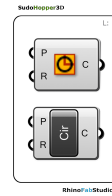


Play Video: Scale circles along the X or Y axis with equal distance in between them

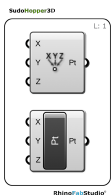
Simple math components



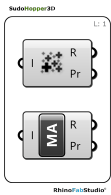
Circle: Create a circle defined by base plane and radius.



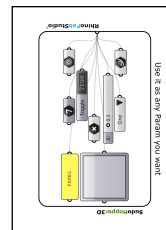
Series: Create a series of numbers. The numbers are spaced according to the {Step} value. If you need to distribute numbers inside a fixed numeric range, consider using the [Range] component instead.



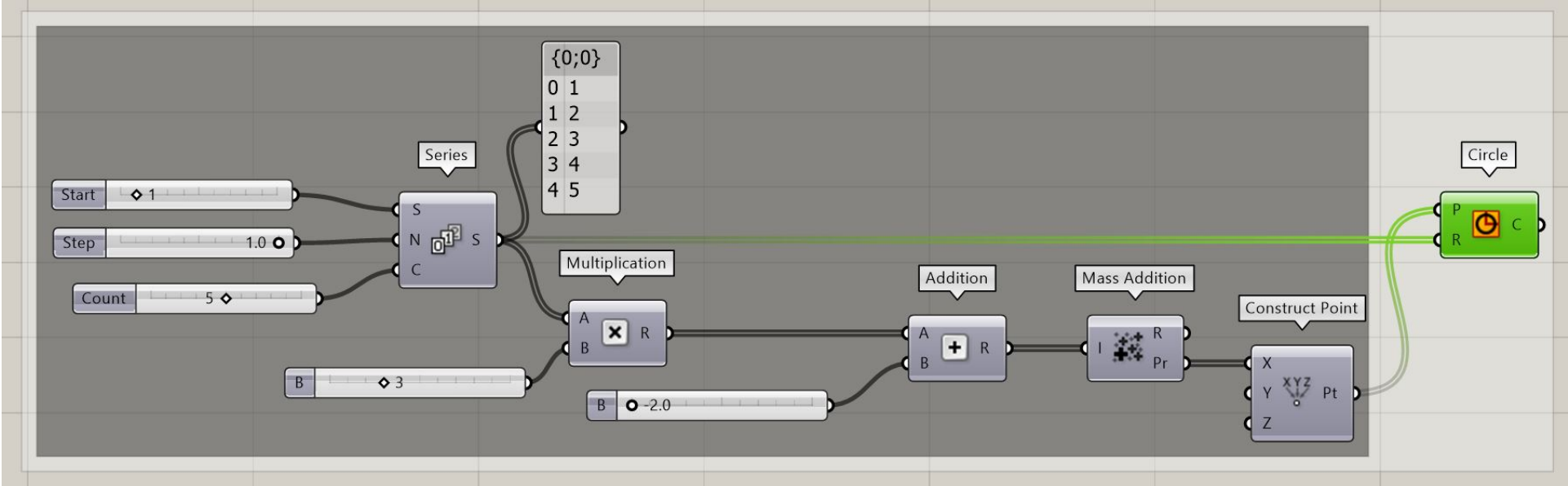
Construct: Construct a point from {xyz} coordinates.



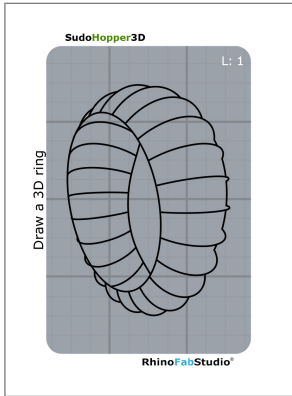
Mass Addition: Perform mass addition of a list of items



Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.

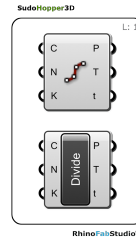


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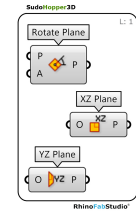


Play Video: Make a 3D parametric ring

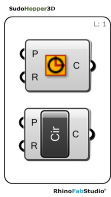
Divide: Divide a curve into equal length segments



Construction Planes: XY, XZ and YZ



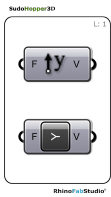
Circle: Create a circle defined by base plane and radius.



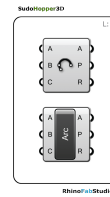
Rotate: Rotate an object in a plane.



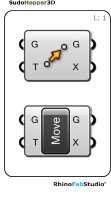
Unit U Y: Unit vector parallel to the world {y}



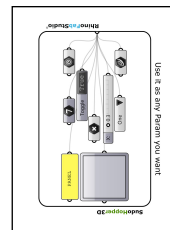
Arc: Create an arc through three points.

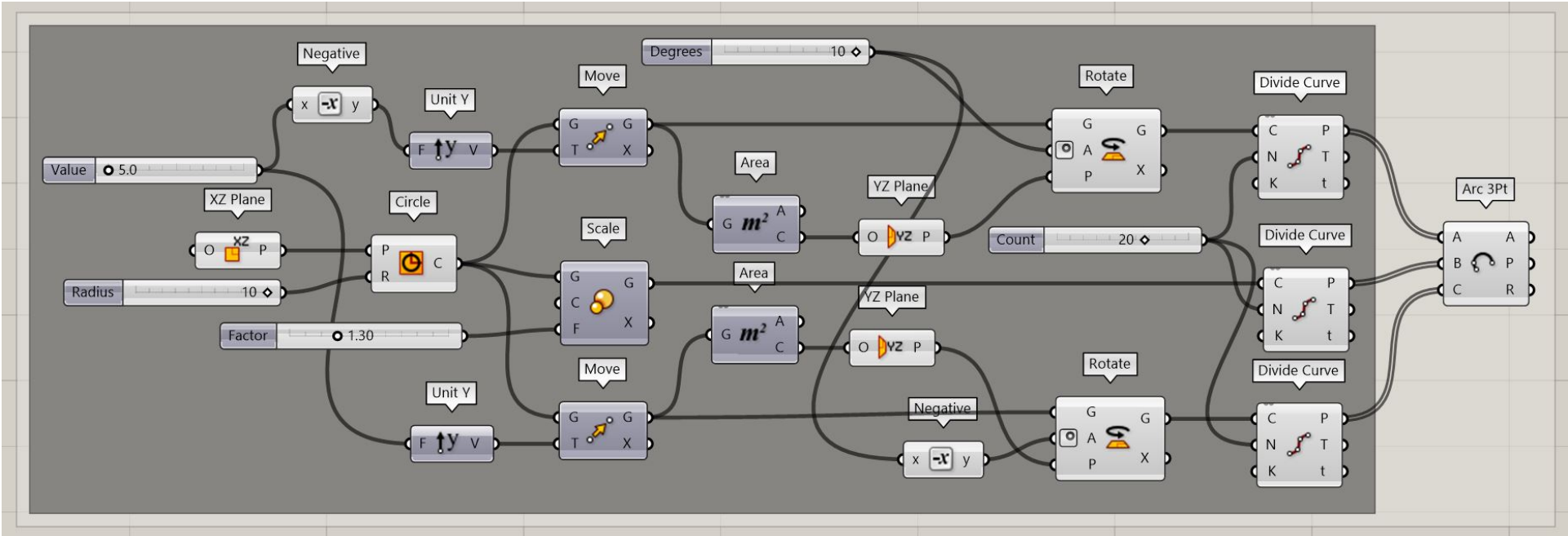


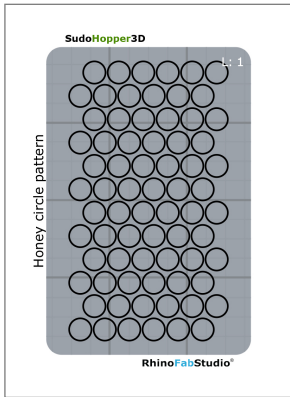
Move: Translate (move) an object along a vector.



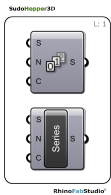
Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.



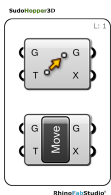




Play Video: Draw a pave (Honeycomb) of circles



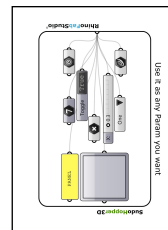
Series: Create a series of numbers. The numbers are spaced according to the {Step} value. If you need to distribute numbers inside a fixed numeric range, consider using the [Range] component instead.



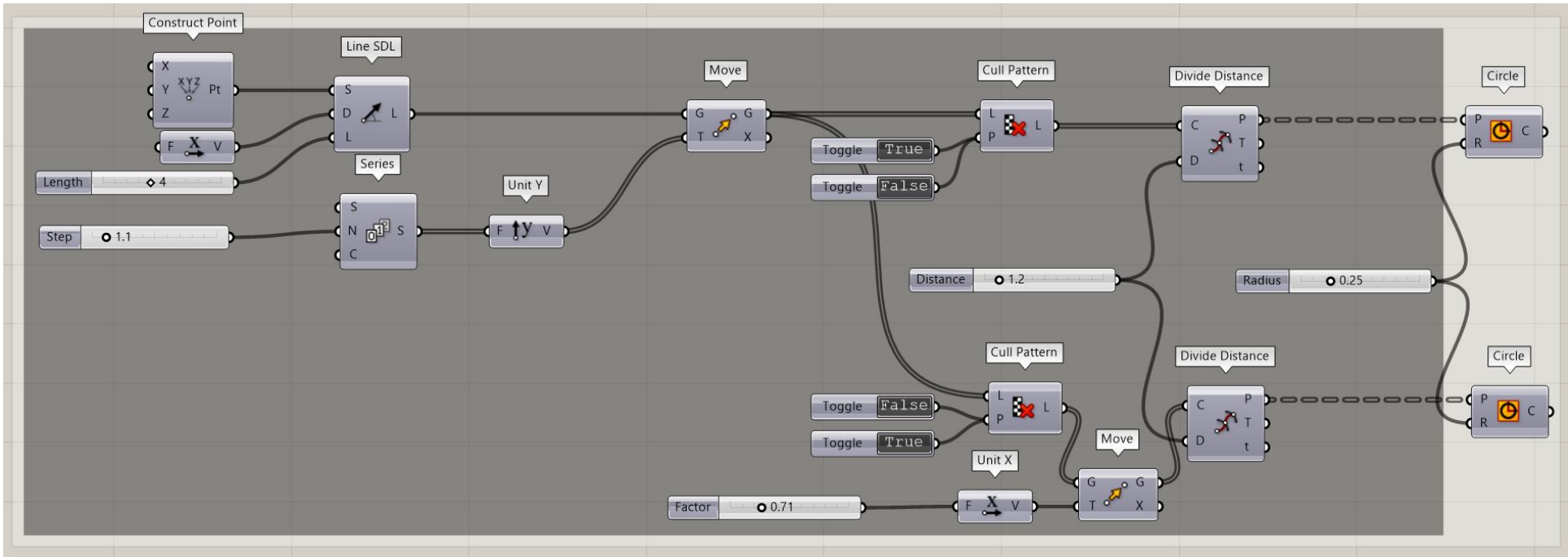
Move: Translate (move) an object along a vector.



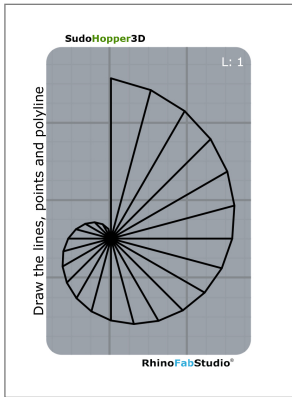
Circle: Create a circle defined by base plane and radius.



Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.

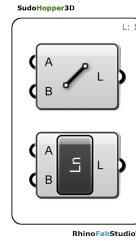


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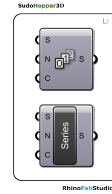


Play Video: Draw a polyline at the end of all those end points

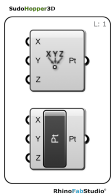
Line: Create a line between two points.



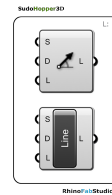
Series: Create a series of numbers. The numbers are spaced according to the {Step} value. If you need to distribute numbers inside a fixed numeric range, consider using the [Range] component instead.



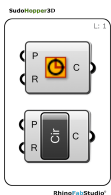
Construct Point: Construct a point from {xyz} coordinates.



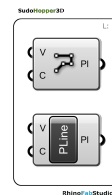
SDL: Create a line segment defined by start point, tangent and length.



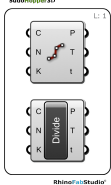
Circle: Create a circle defined by base plane and radius.



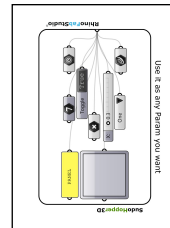
Polyline: Create a polyline connecting a number of points.

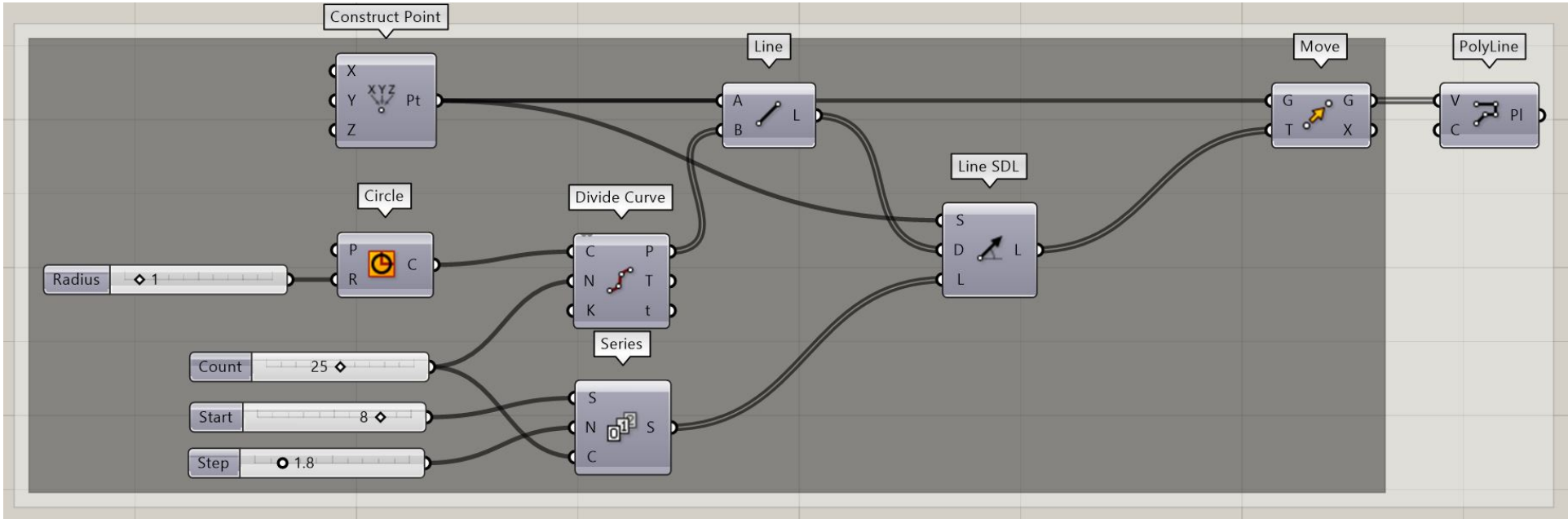


Divide: Divide a curve into equal length segments



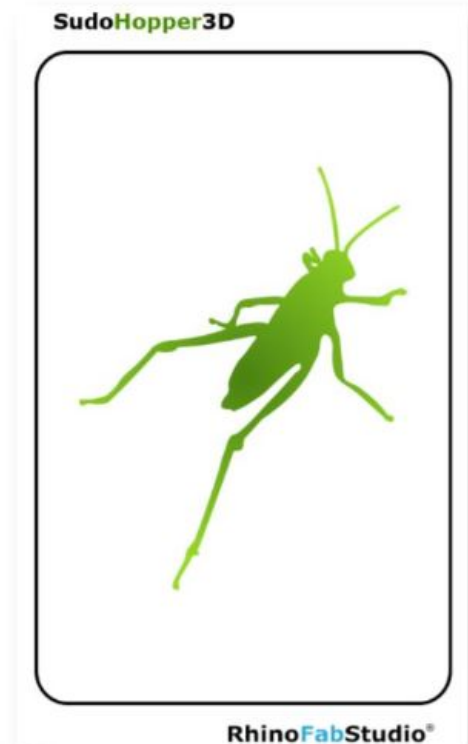
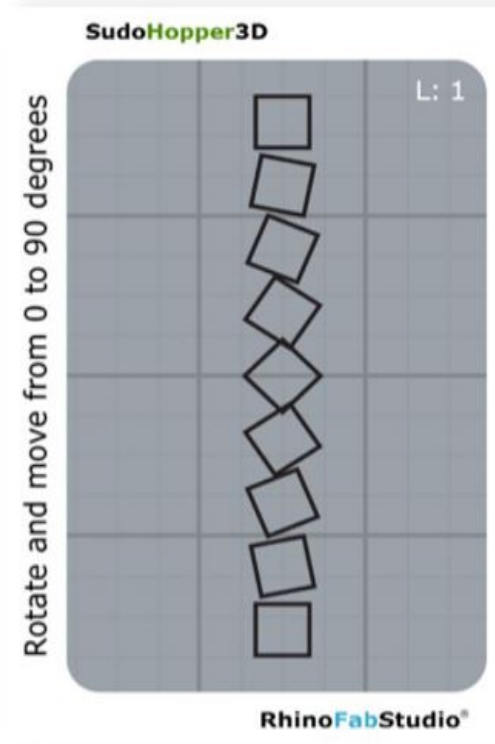
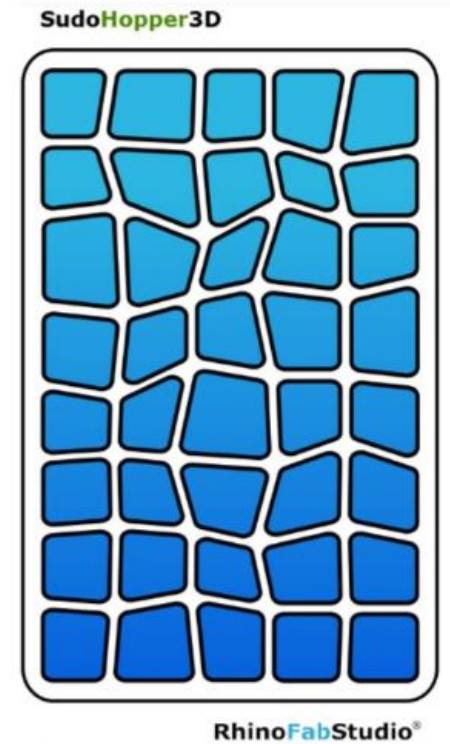
Params: Parameters, the list of all of them in one single card. You can use it to select only one object from the Rhino model. You can use any param as many times as you need. **Sample:** You may need two numeric sliders, you can use one card to do so.





Teacher's guide

Level: 1



SudoHopper3D

Play, ponder and learn