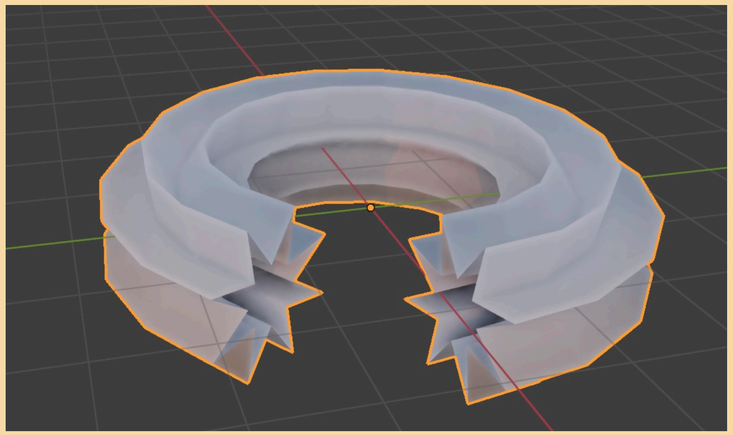
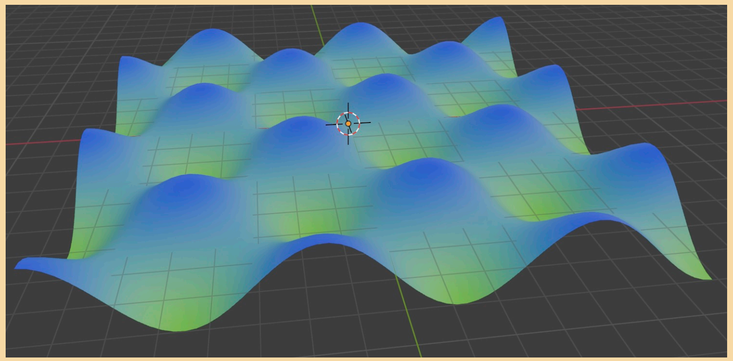
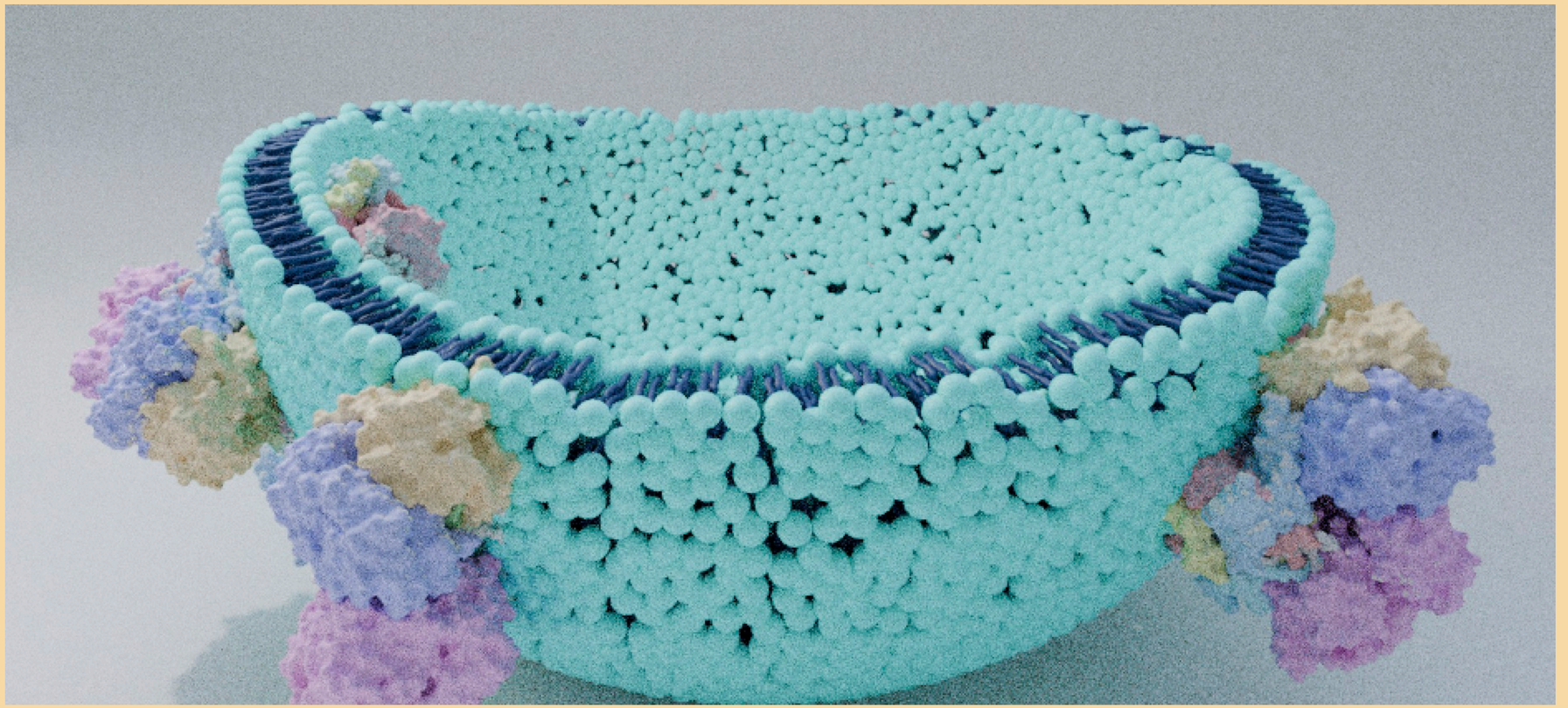
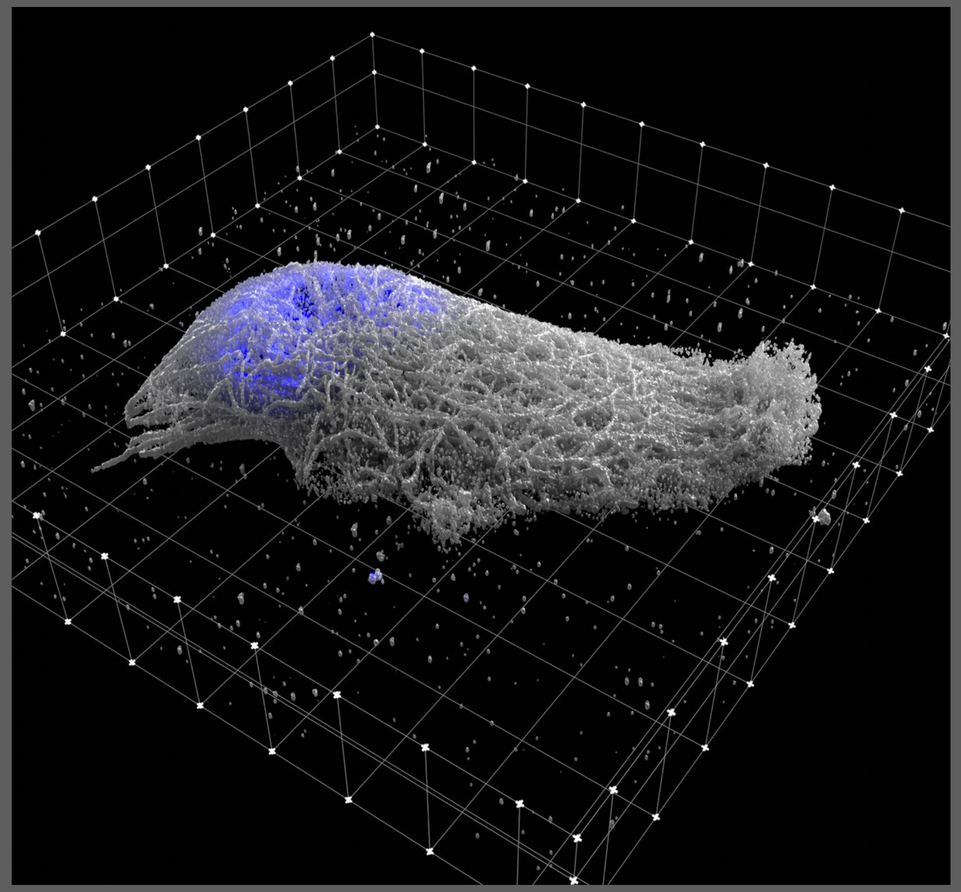
Day 2 - Geometry Nodes & Scientific Extensions







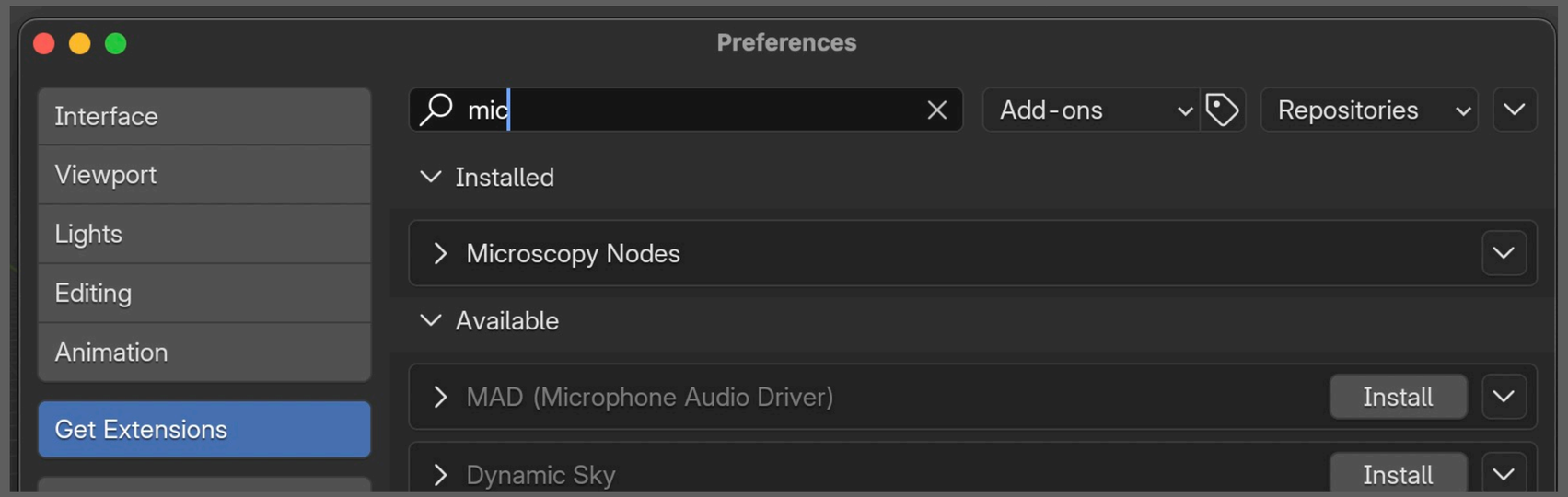
Microscopy Nodes



By Aafke Gros

https://github.com/aafkegros/MicroscopyNodes

Microscopy Nodes

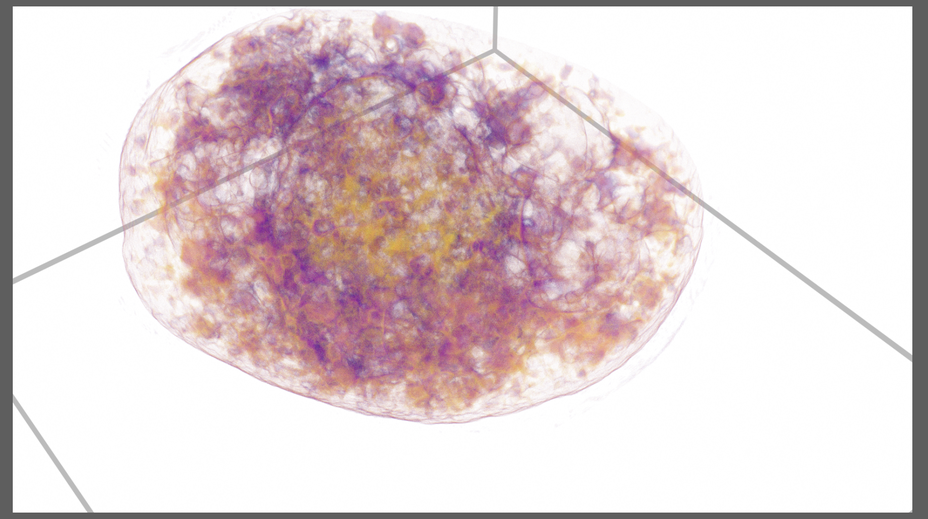


Microscopy Nodes - Sample Data

EM Data

https://s3.embl.de/microscopynodes/FIBSEM_dino.zarr

https://s3.embl.de/microscopynodes/FIBSEM_dino_masks.zarr

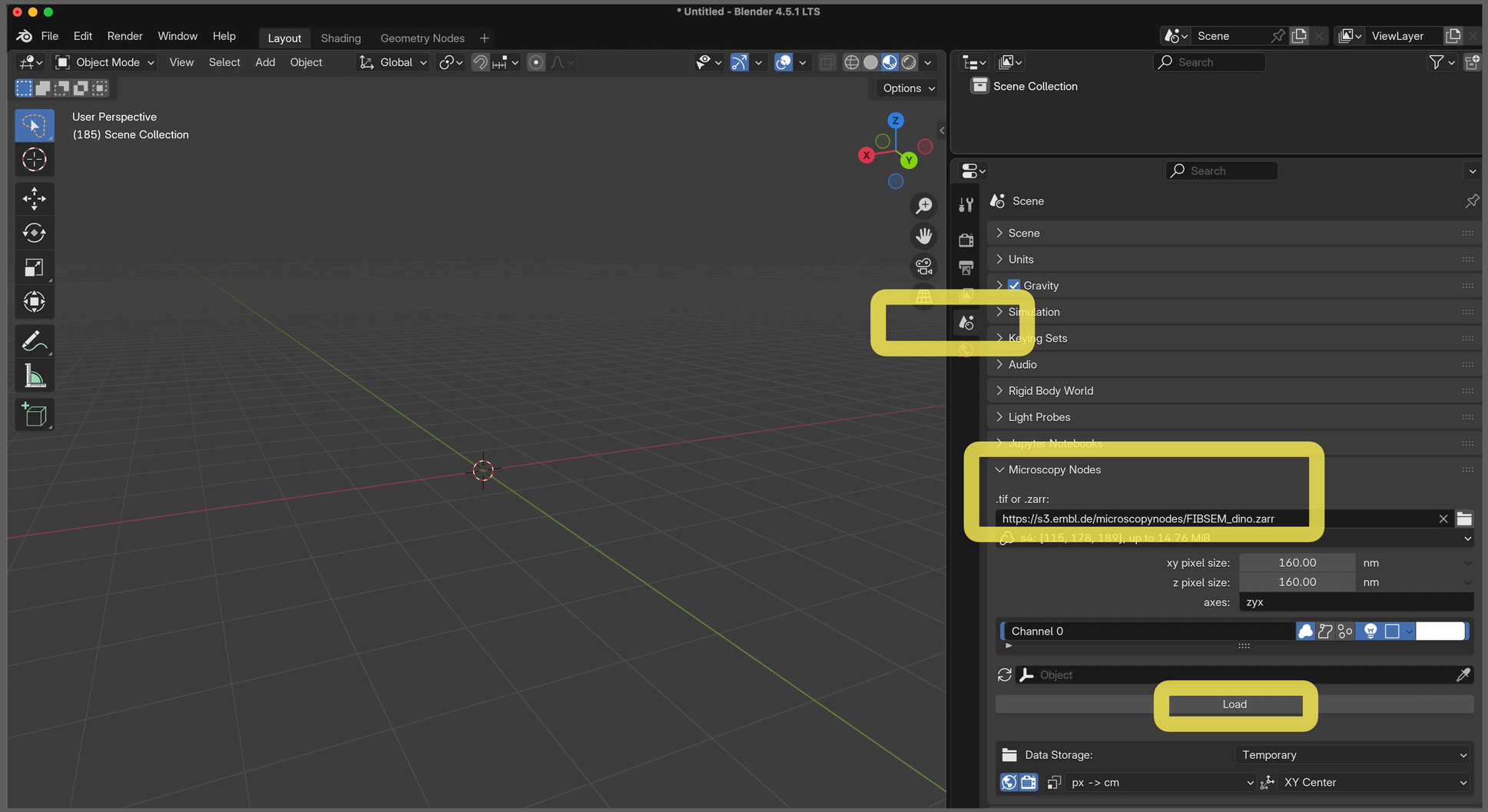


Fluorescence microscopy:

https://s3.embl.de/microscopynodes/RPE1_4x.zarr

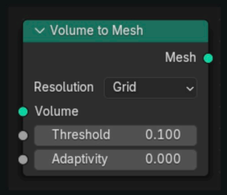
https://s3.embl.de/microscopynodes/lightsheet_masks.zarr

Microscopy Nodes - Load data



Volume to Mesh: How?

Volume to Mesh Node



The *Volume to Mesh* node generates a mesh on the "surface" of a volume. The surface is defined by a threshold value. All voxels with a larger value than the threshold are considered to be inside.

Inputs

Volume
Standard geometry input.

Voxel Amount
Specifies the approximate resolution of the final mesh. The voxel size is adapted to the size of the entire volume.

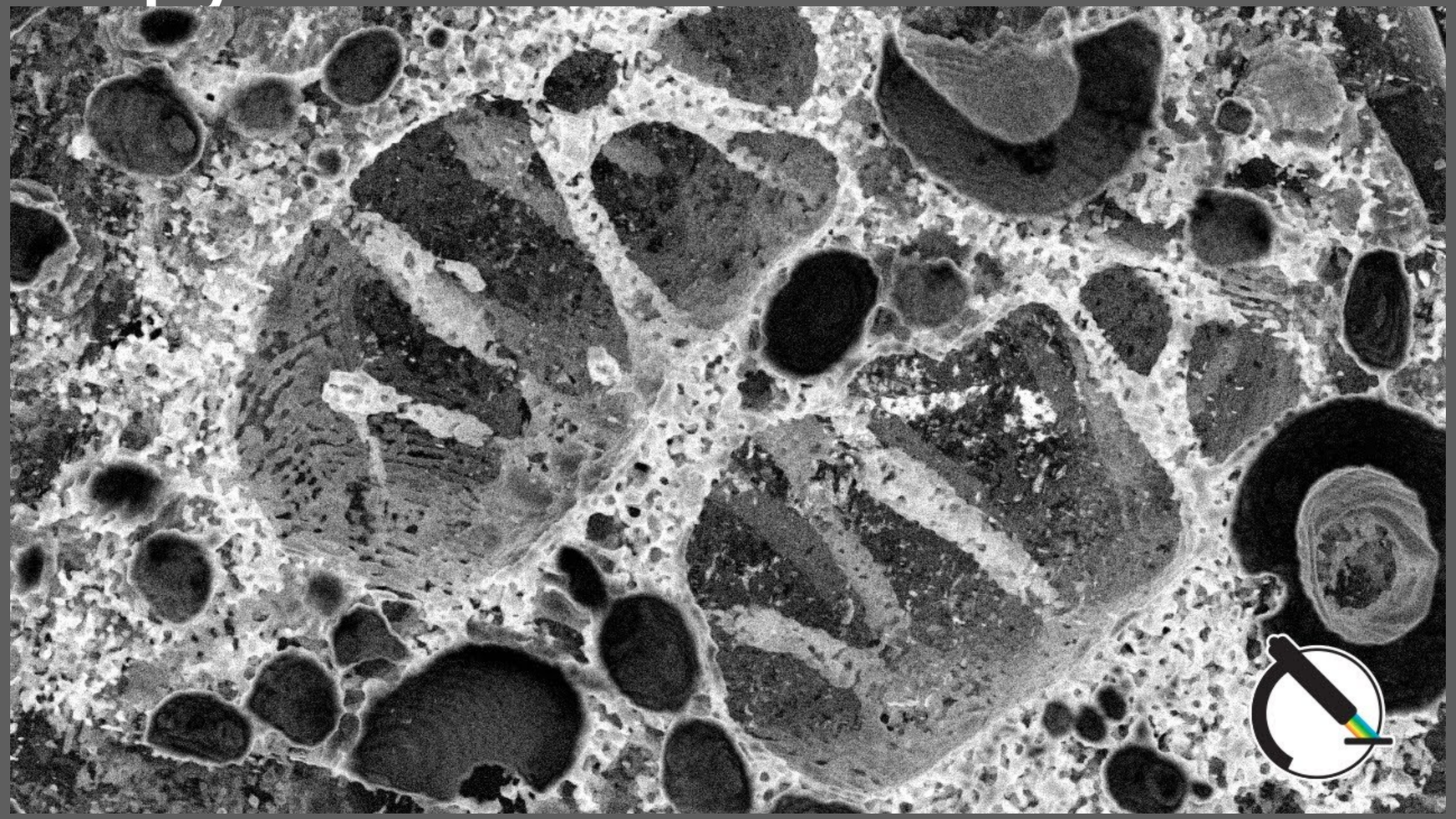
Voxel Size
Use a fixed resolution that does not change when the volume changes.

Threshold
Voxels with a larger value are considered to be inside the mesh. The mesh will be generated on the boundary of inside and outside voxels. This is also called "iso value".

Adaptivity
Reduces the final face count by simplifying geometry where detail is not needed. This is similar to decimating the final to reduce resolution where it is not needed.

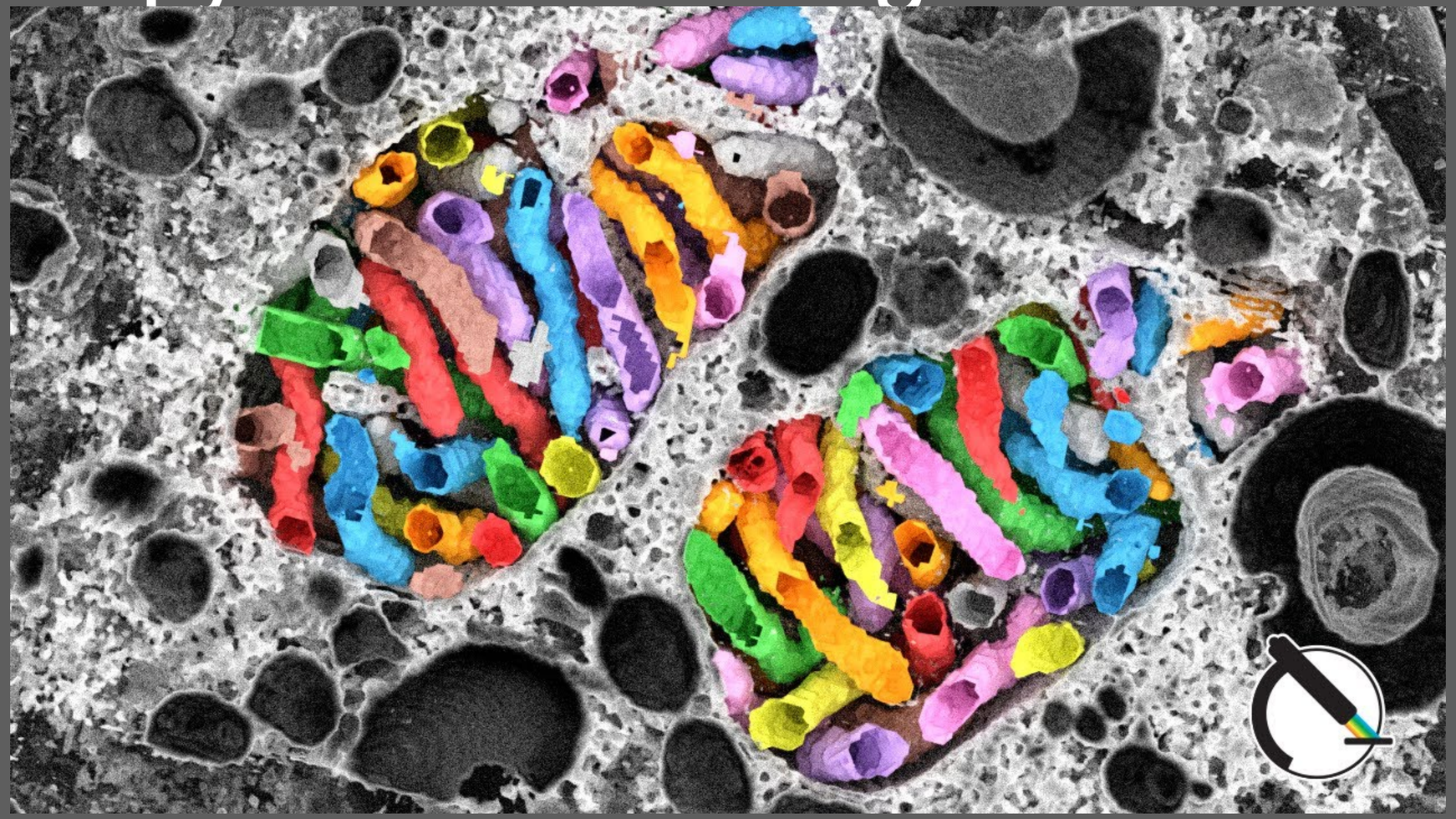
https://docs.blender.org/manual/en/4.5/modeling/geometry_nodes/volume/operations/volume_to_mesh.html

Microscopy Nodes- Surfaces and label masks



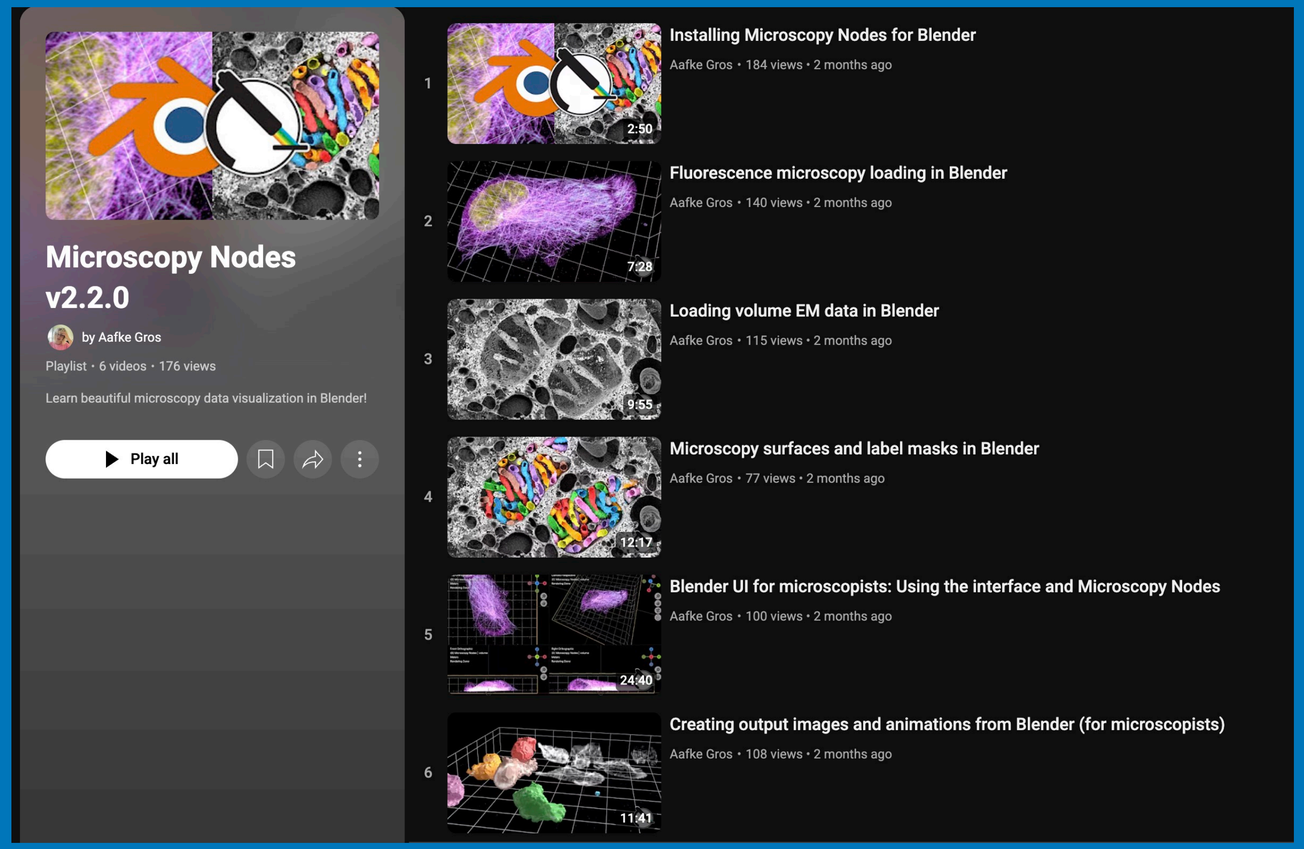
https://www.youtube.com/watch?v=Rwq7Tu8Avss

Microscopy Nodes- Loading volume EM data



https://www.youtube.com/watch?v=YO3FxTFGH00

Further Resources-Microscopy Nodes

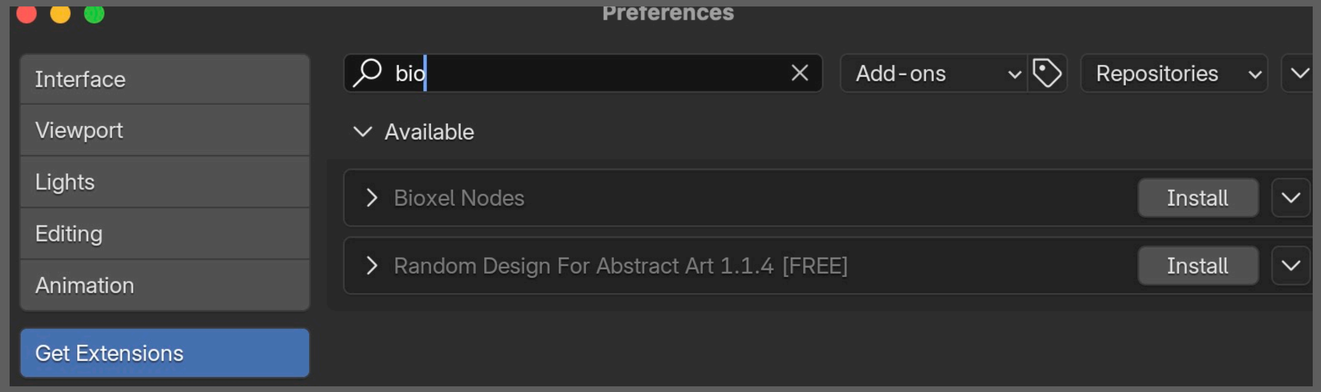


https://www.youtube.com/playlist?list=PLAv6_GEMrbKcLE3CJtM4UTzlVW1ZycPUG

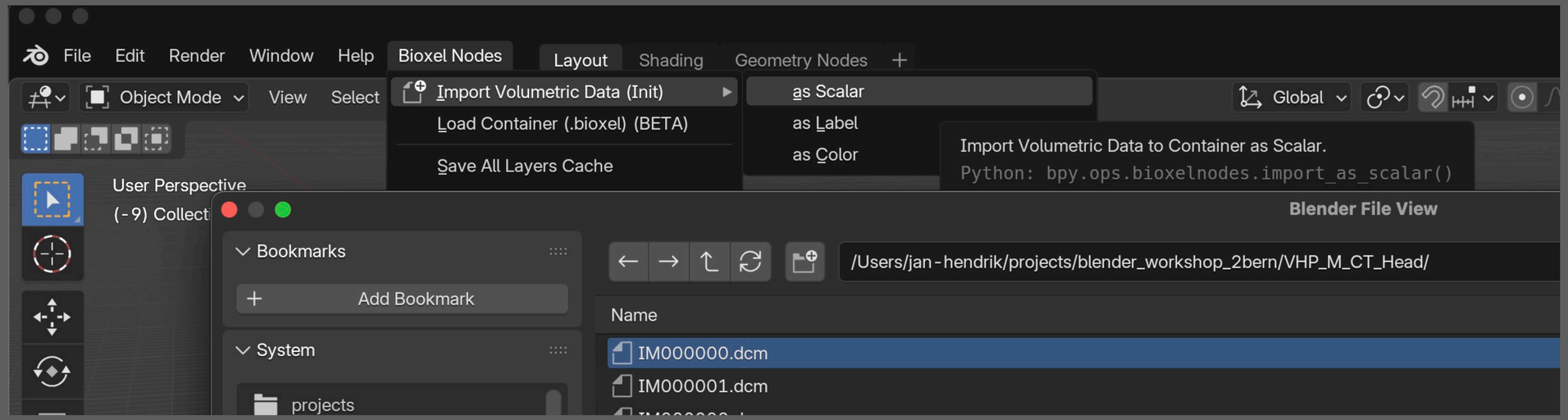
https://extensions.blender.org/add-ons/microscopynodes/

Bioxel - Addon

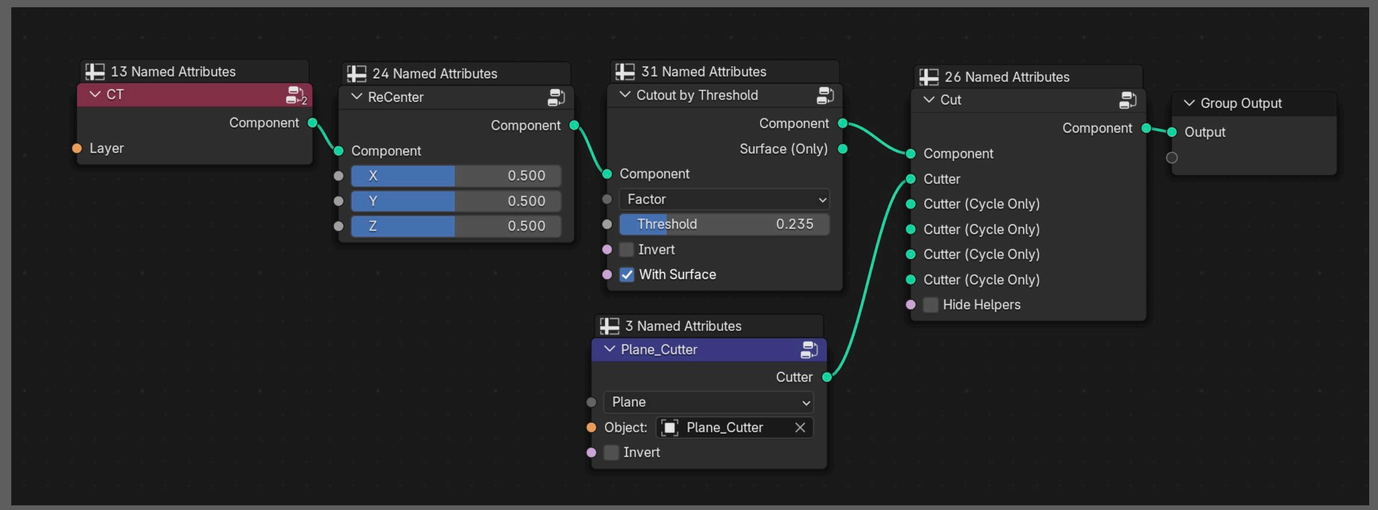
Bioxel - Install

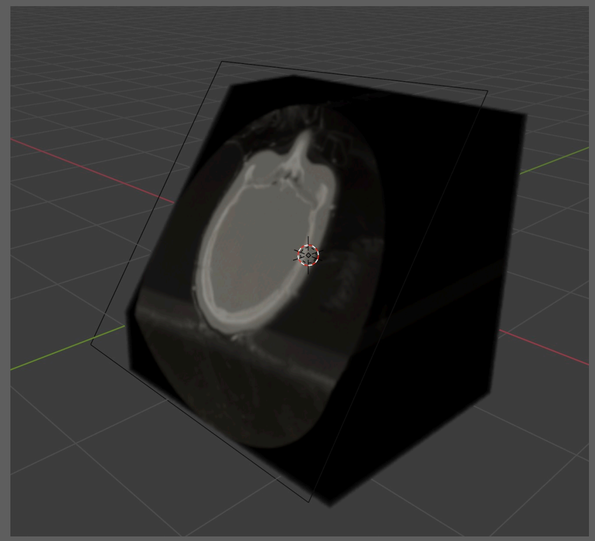


Load images



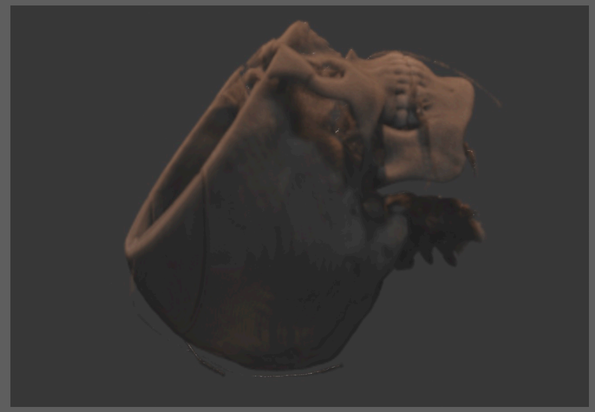
Bioxel Example Scene



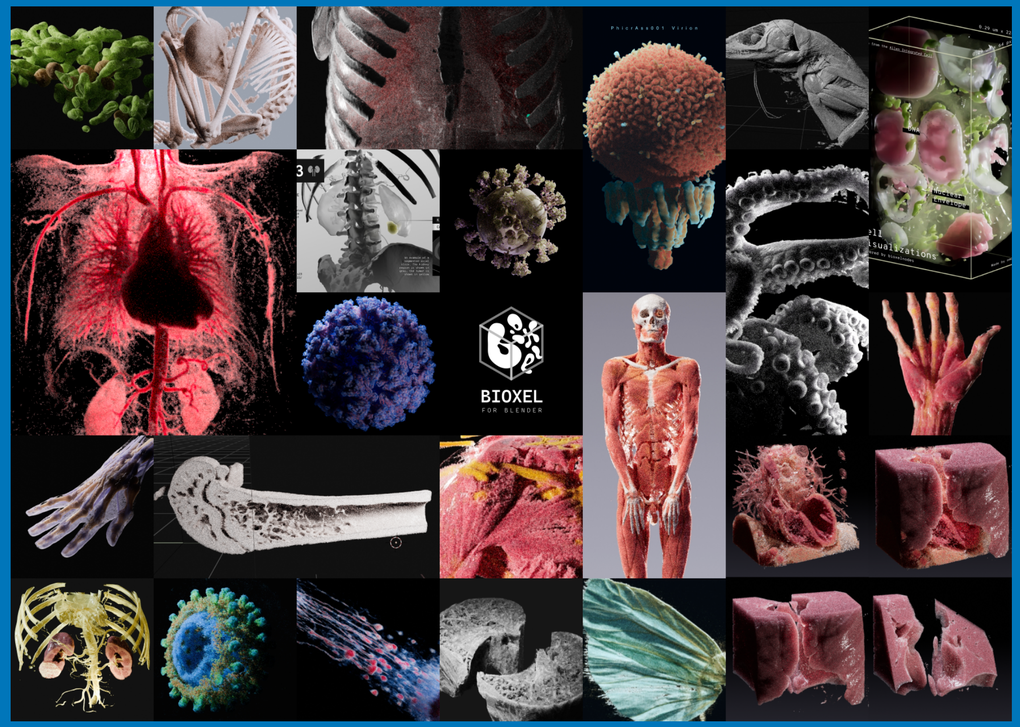


Tasks:

- Open „Bioxel_head.blend“
- Change the Cutout Threshold in GeoNodes
- Move the „Plane_Cutter“ object
- Add lights to the Scene



Further Resources - Bioxel



https://omoolab.github.io/BioxelNodes/latest/step_by_step/

Geometry Nodes

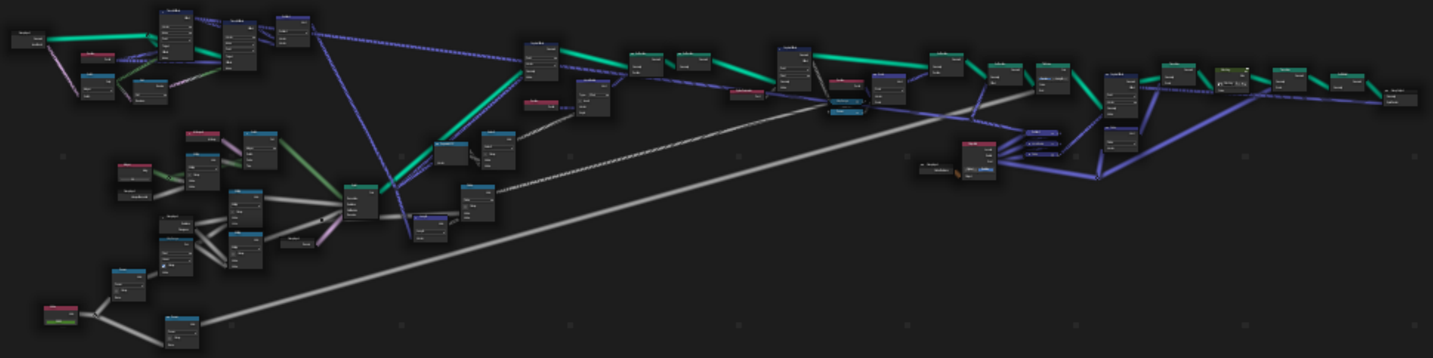
Jan-Hendrik Müller

Blender 4.5.1

August 2025

View Select Add Node Spiral 213

Spiral > GeometryNodes > Spiral



Spiral > GeometryNodes

Add Modifier

GeometryNodes

Spiral 213

Invert Controls 1

Reverse 0

Rotations 3.784

Divergence 0.104

Viewport Resoluti... 0.500

Global Reference global

Output Attributes

Spiral Center pos

WeightedNor...

Procedural fantasy city creation using Geometry Nodes

Blender
1.2M subscribers

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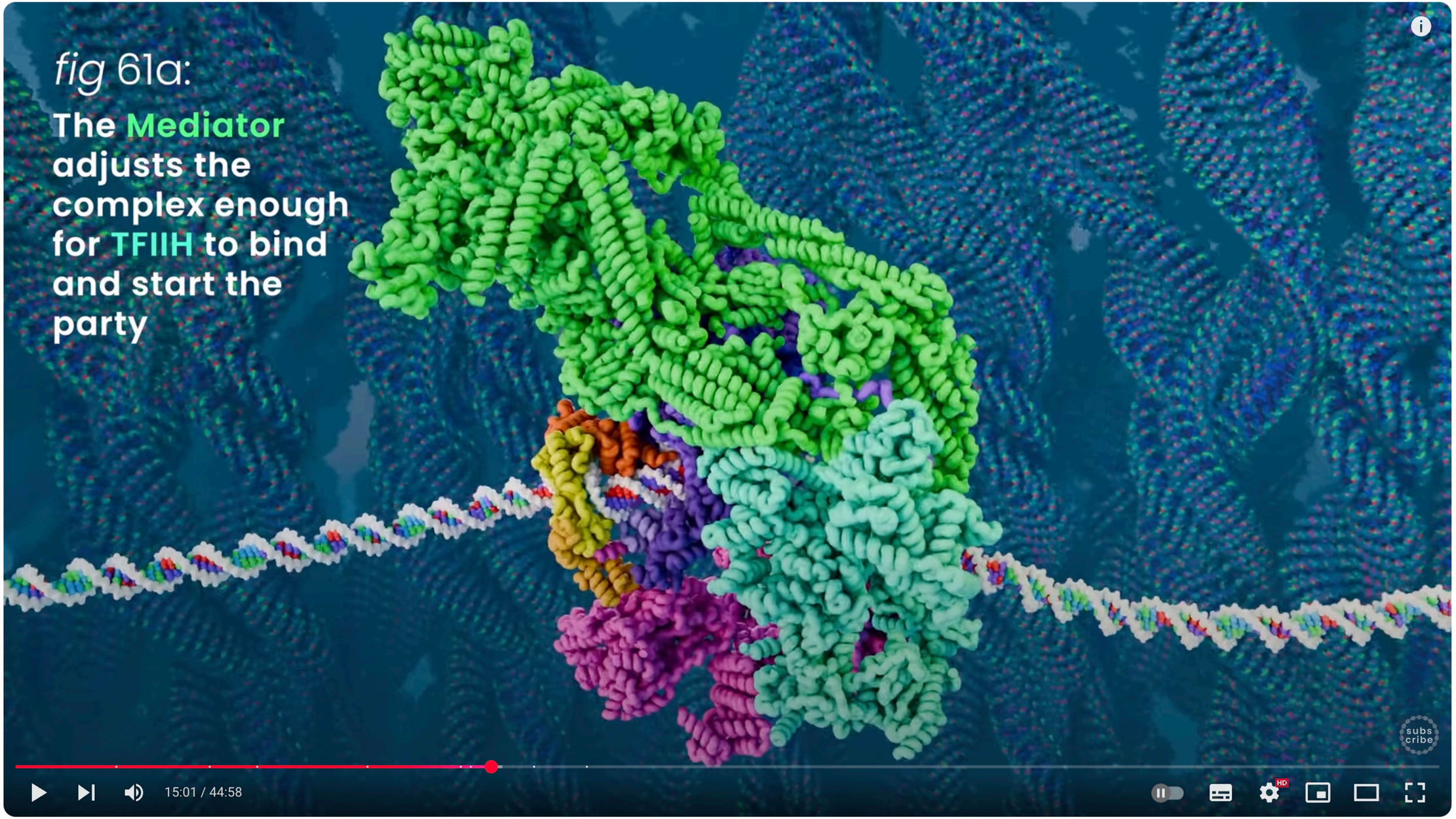
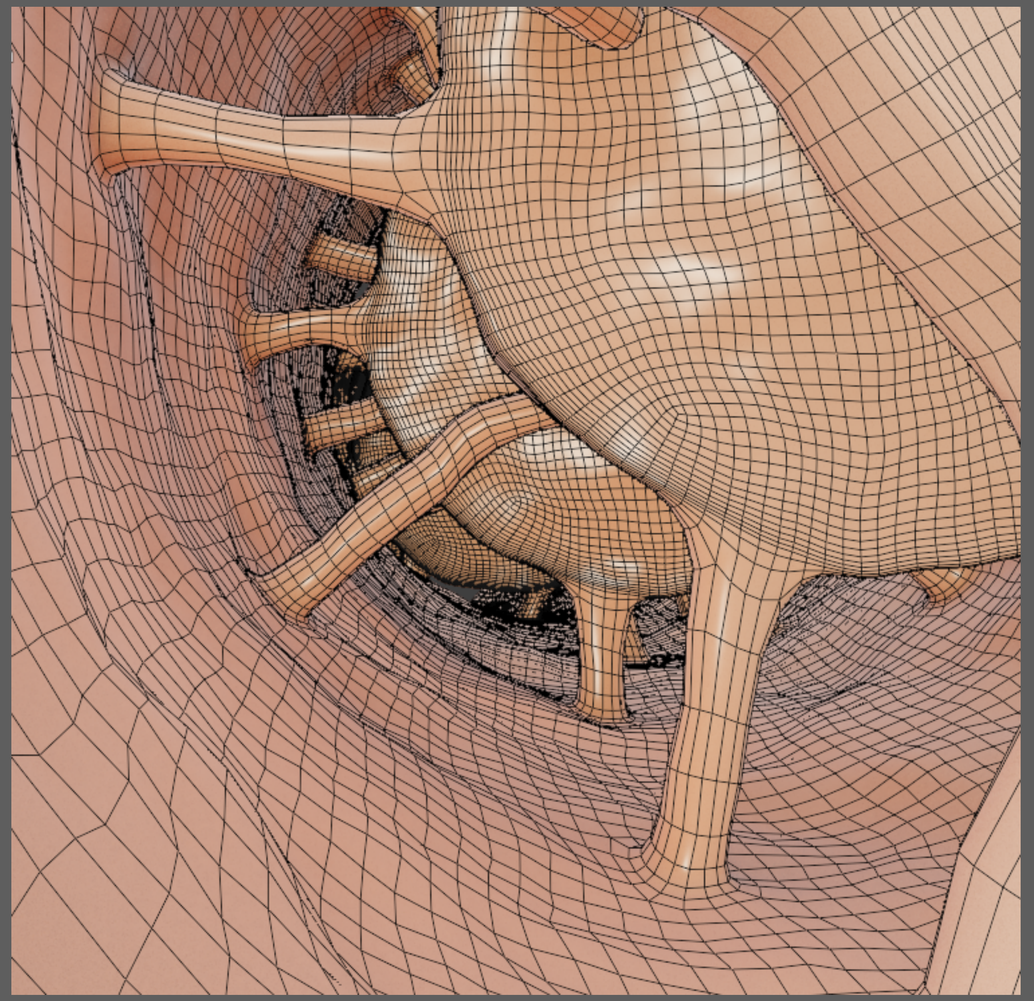
209K views 2 years ago

Live chat replay



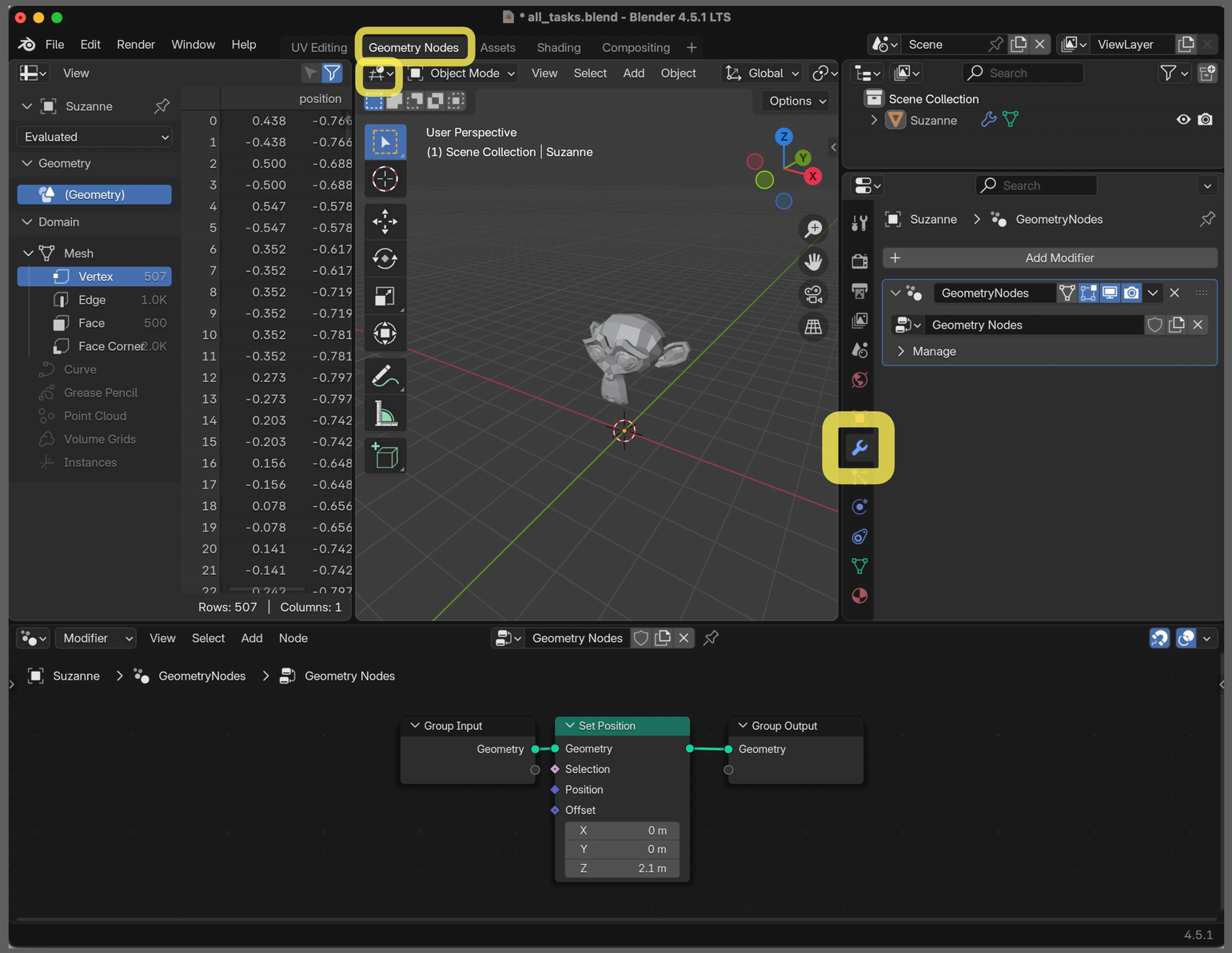
Your Operating System | Eukaryotic Transcription

Procedural mitochondrion



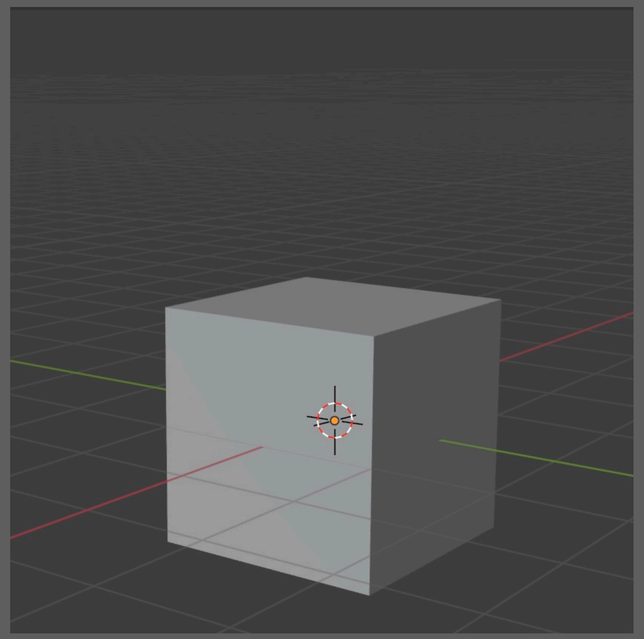
By Phusis

Geometry Nodes Location

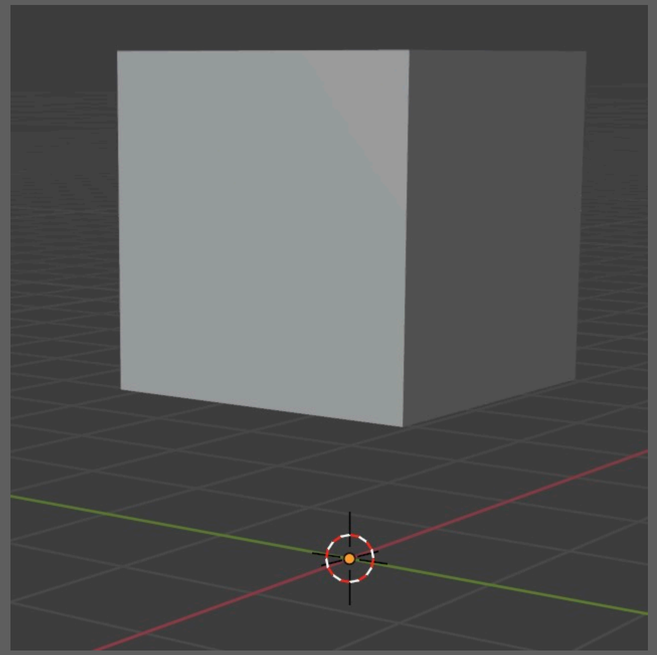


Properties
-> Modifier

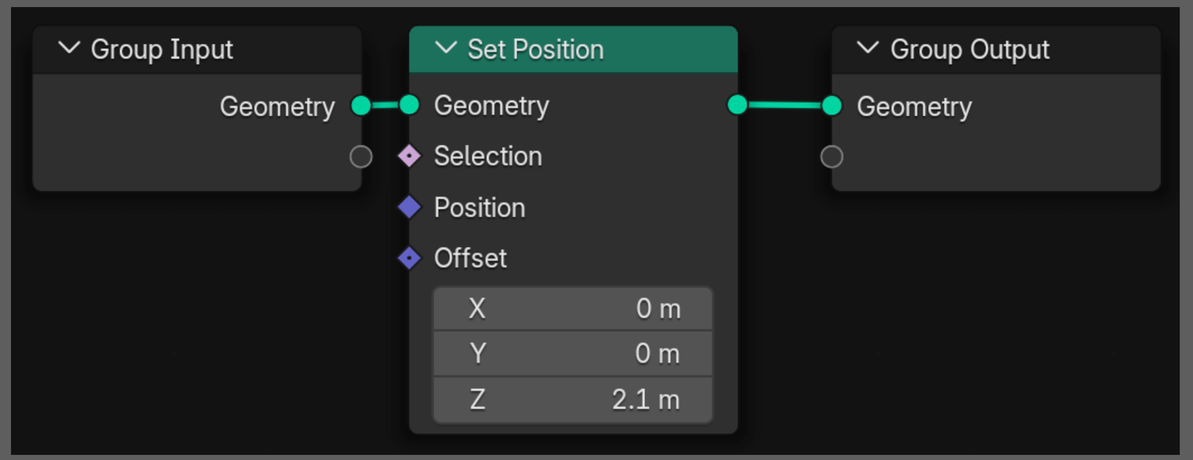
Geometry Nodes = Custom Modifier



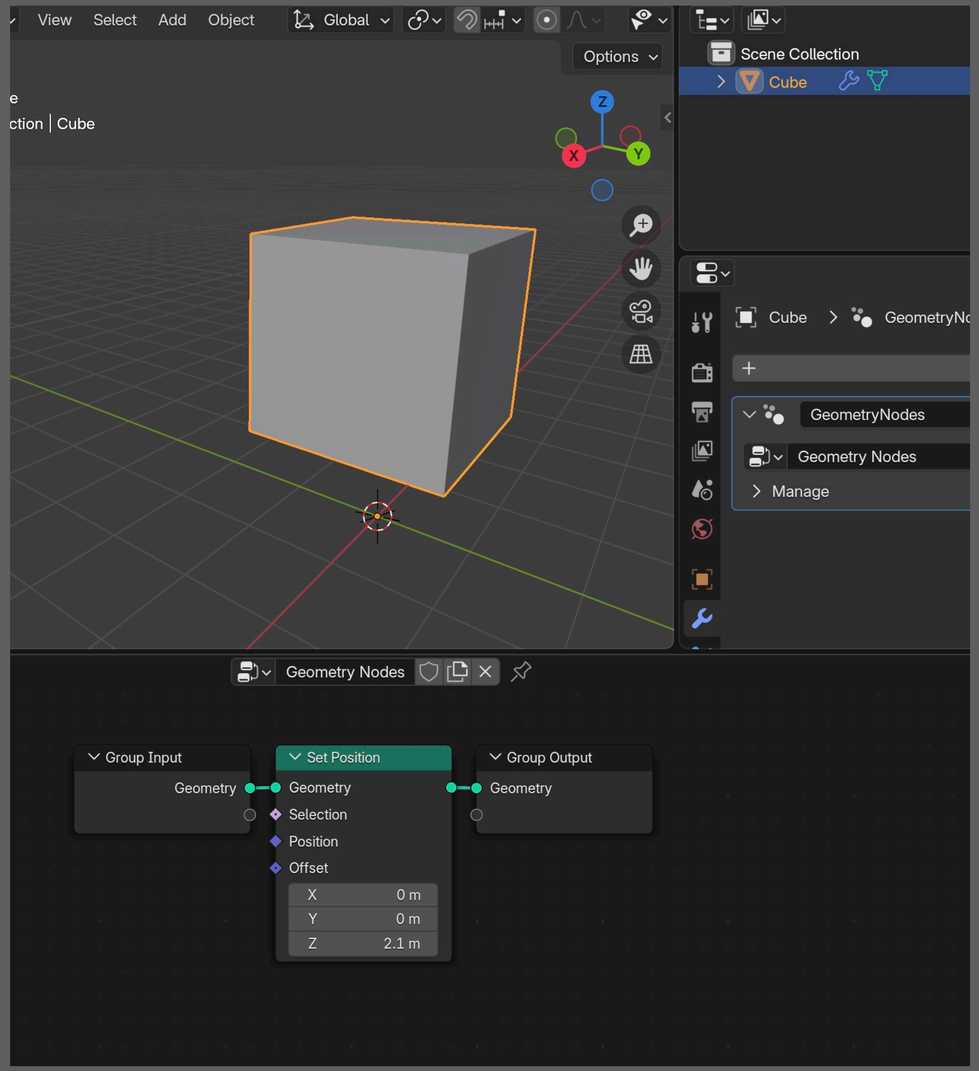
Original

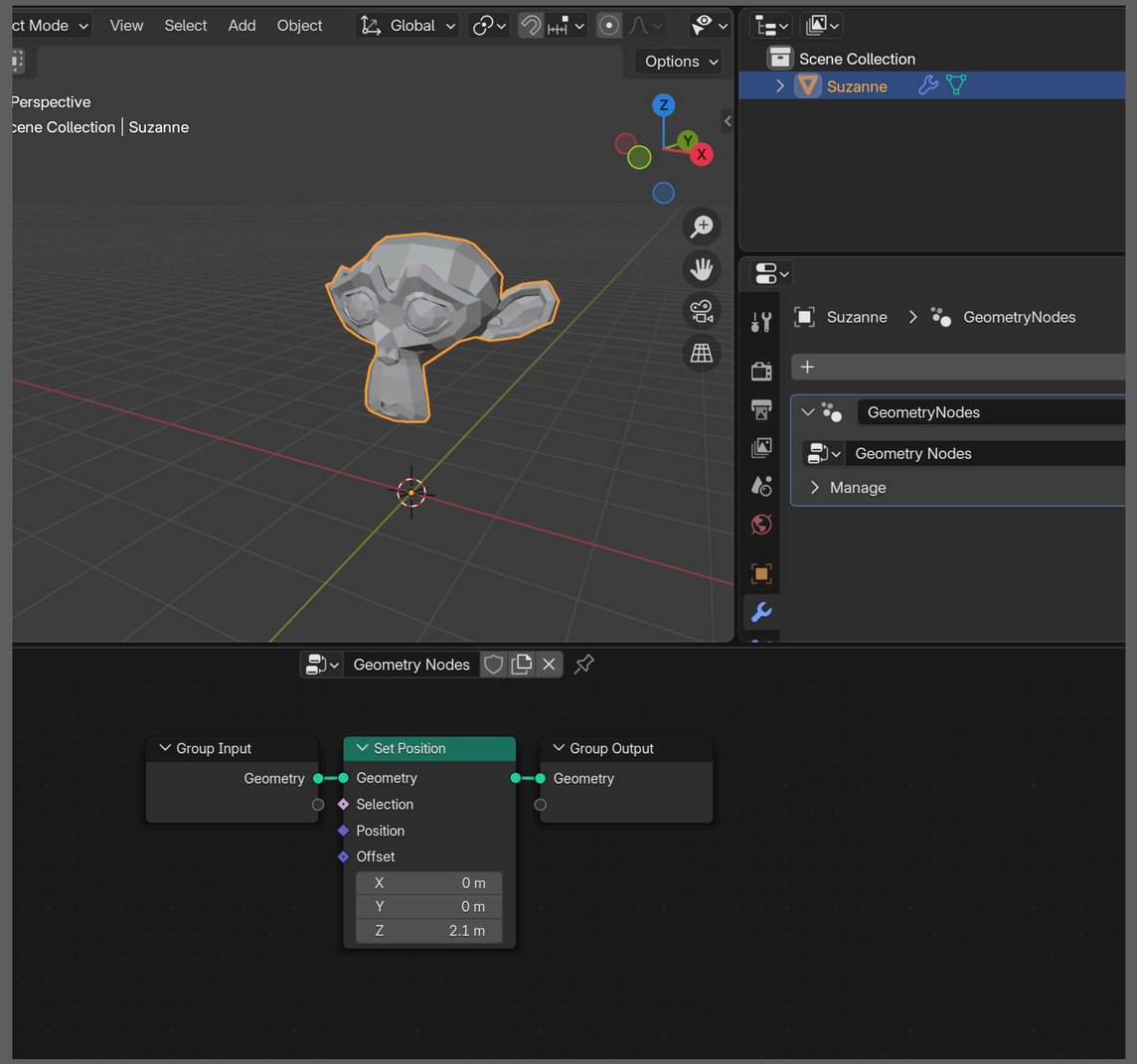


With Geometry Nodes



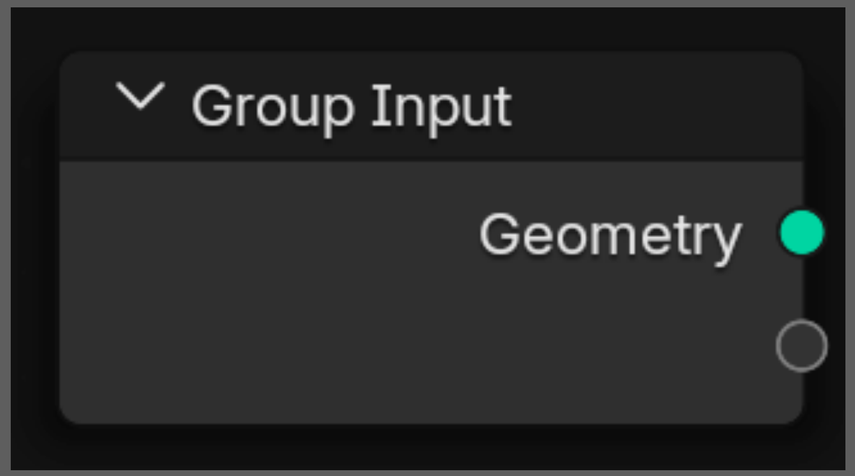
Apply to any object



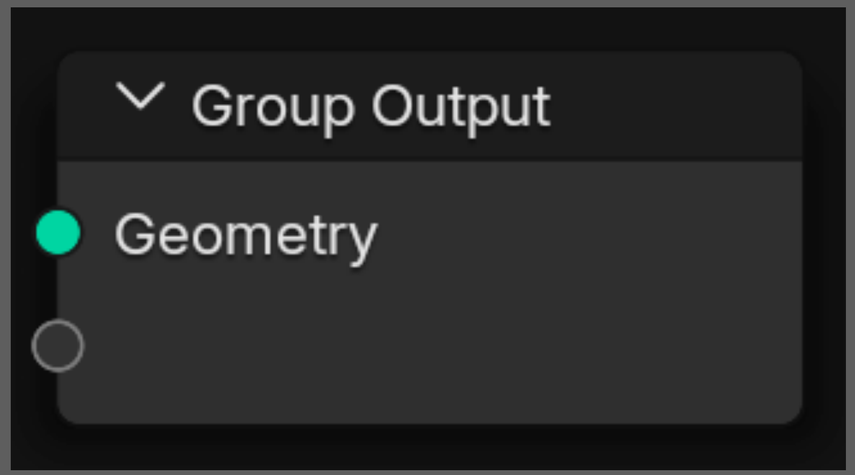


Data Flow

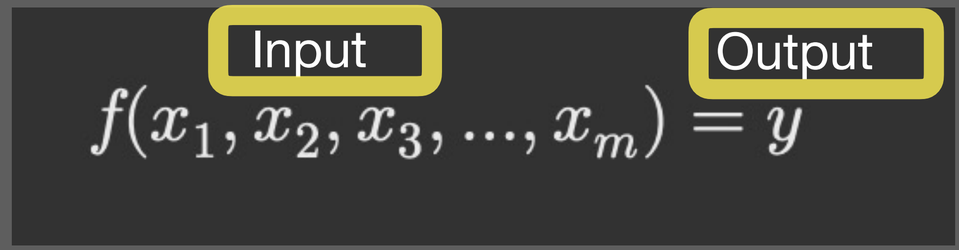
Input:
Optional



Output:
Always needed, exactly one time!

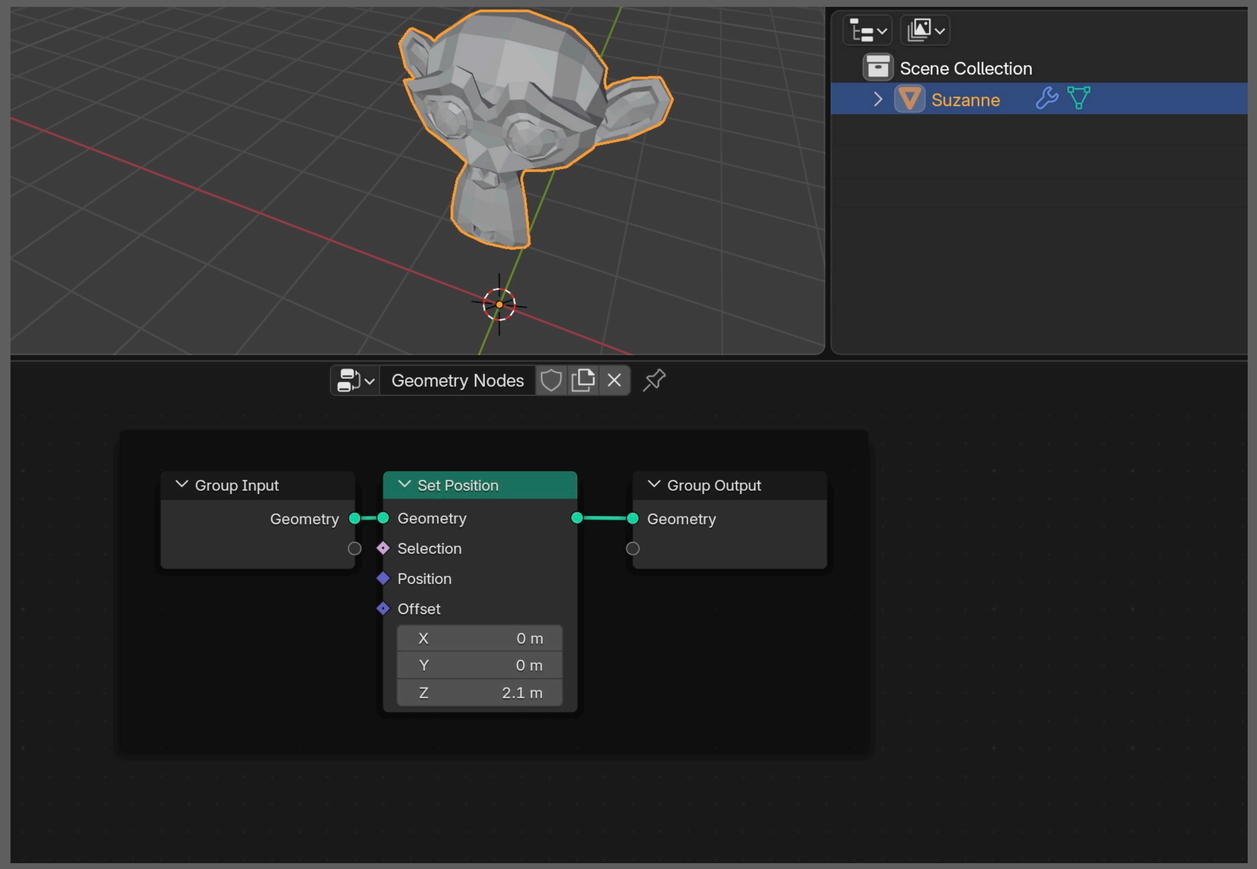


Analogy: Think of GeoNodes like functions

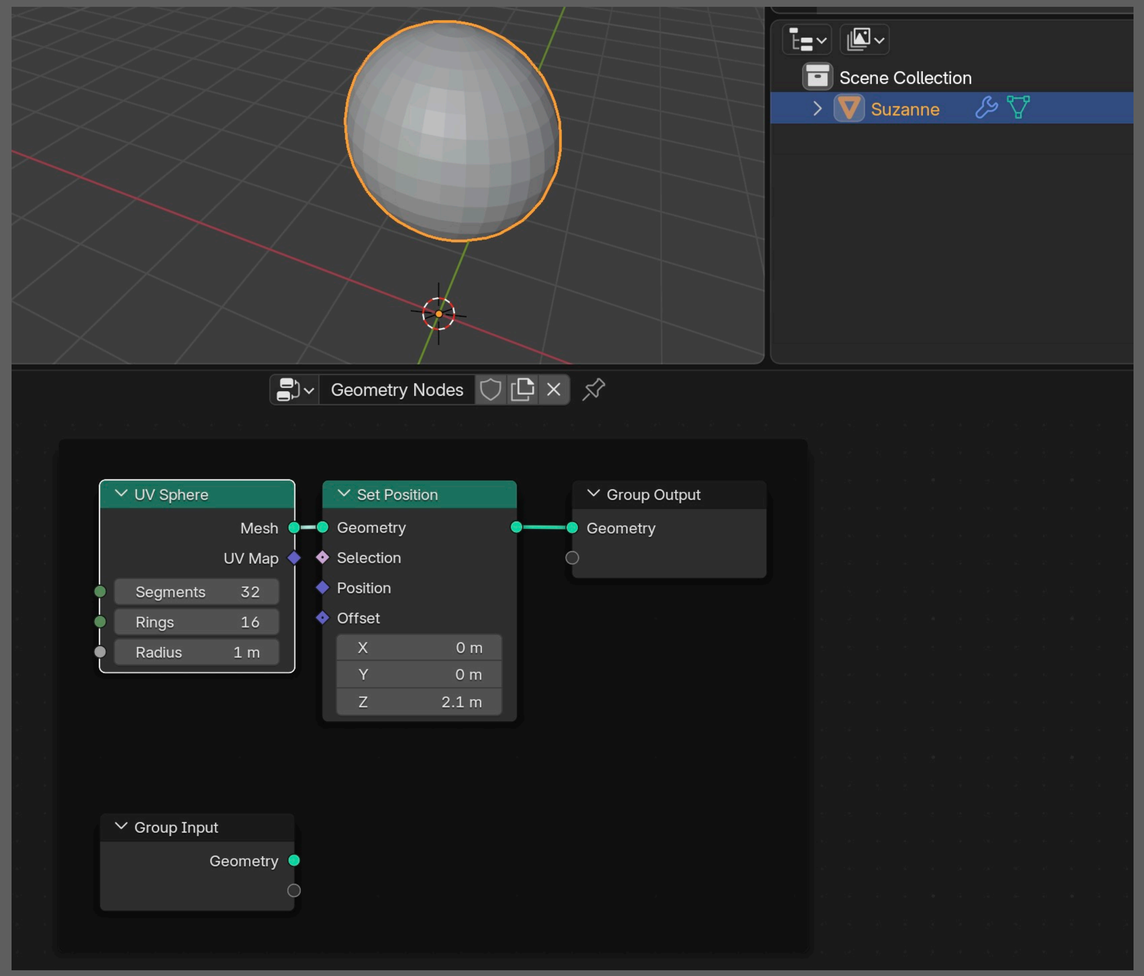


Data Flow

Used input object

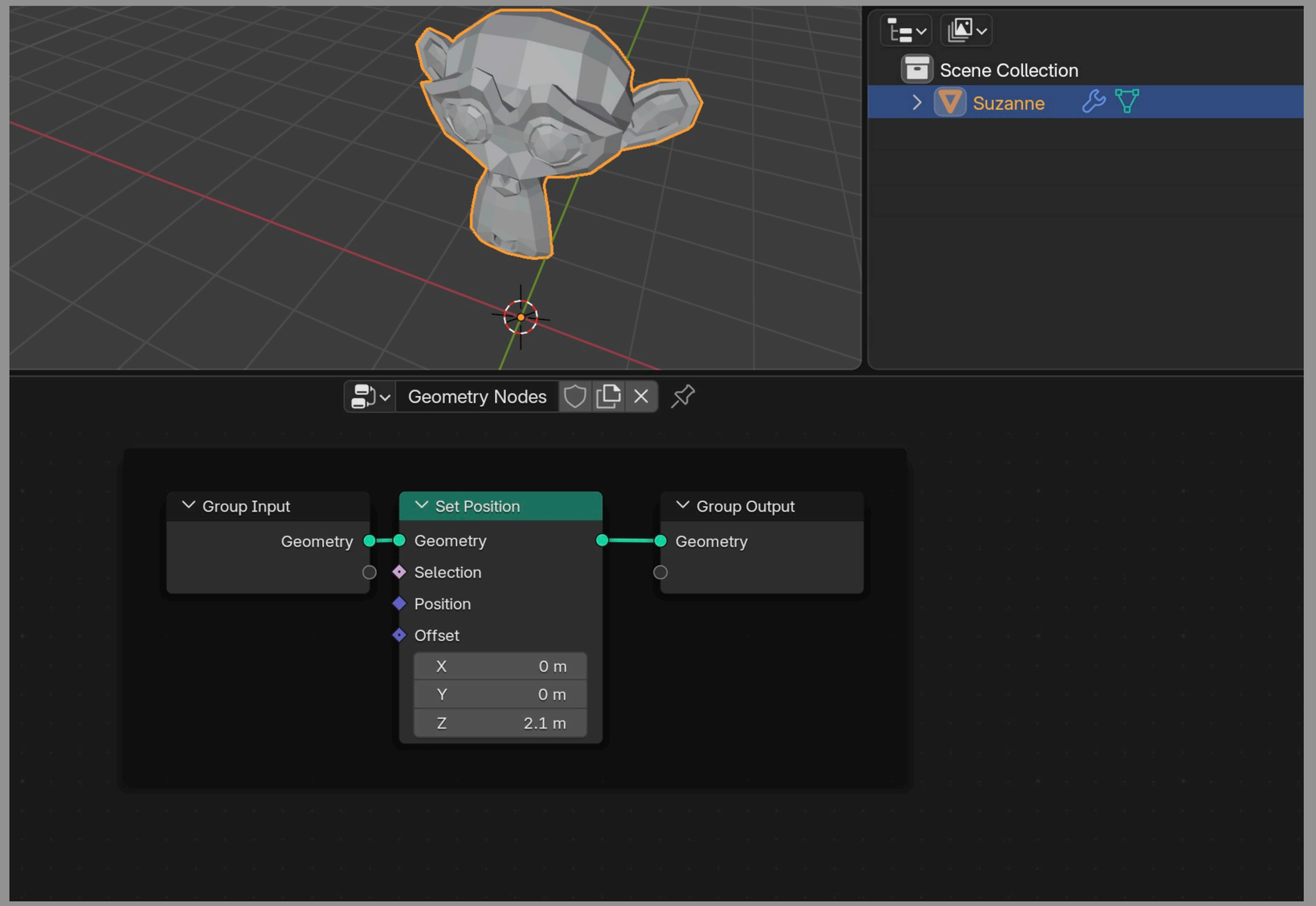


Unused input object



Data Flow

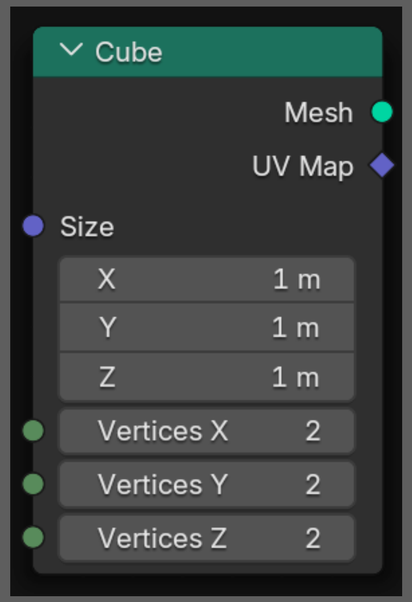
Task: Use the Set Position Node

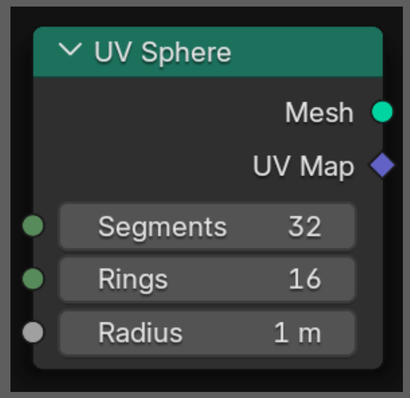


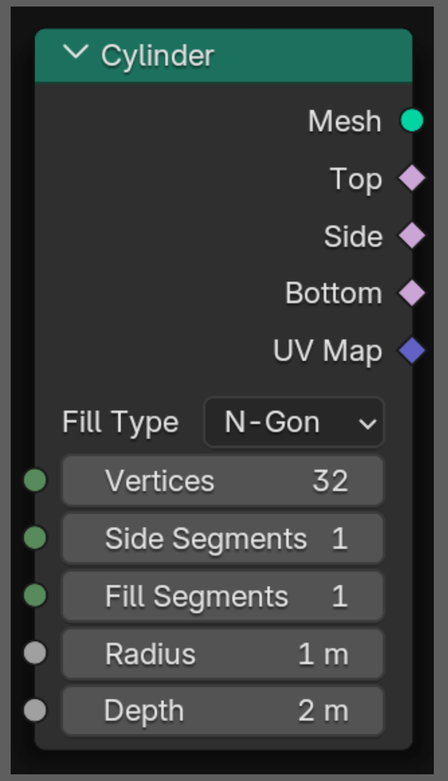
Questions:

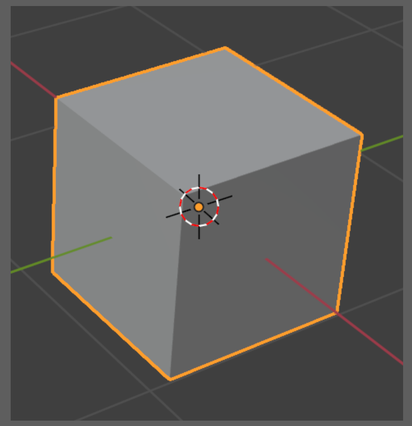
- What happens to the origin?
- How do I cut Geometry connections?

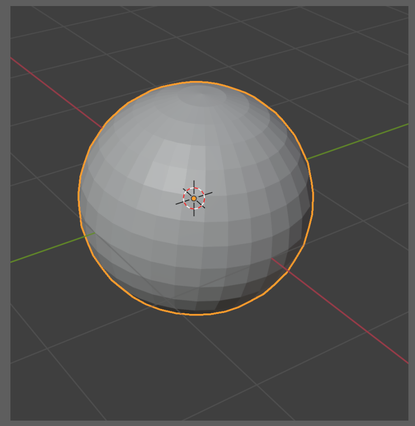
Mesh Primitives

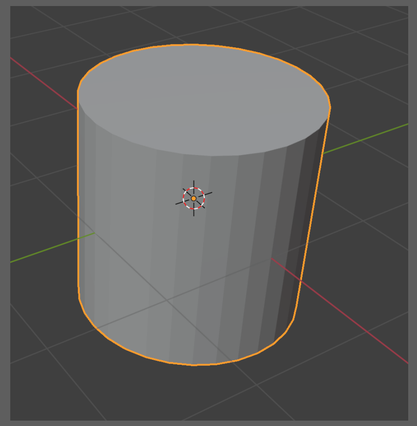




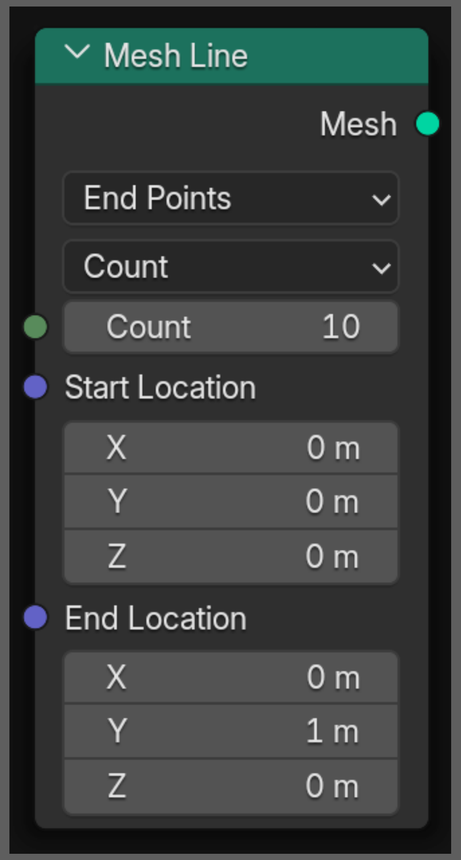


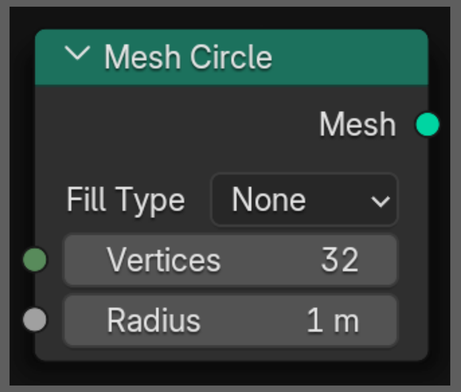


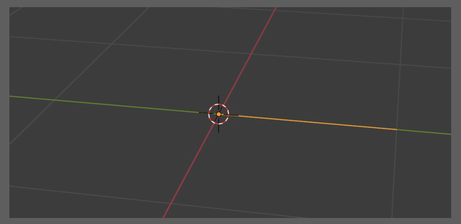


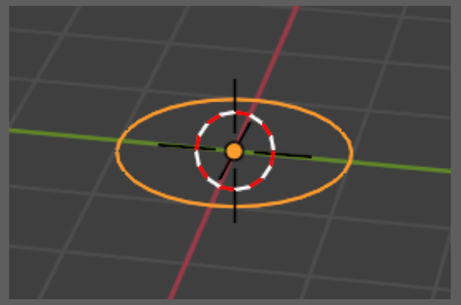


Mesh Primitives

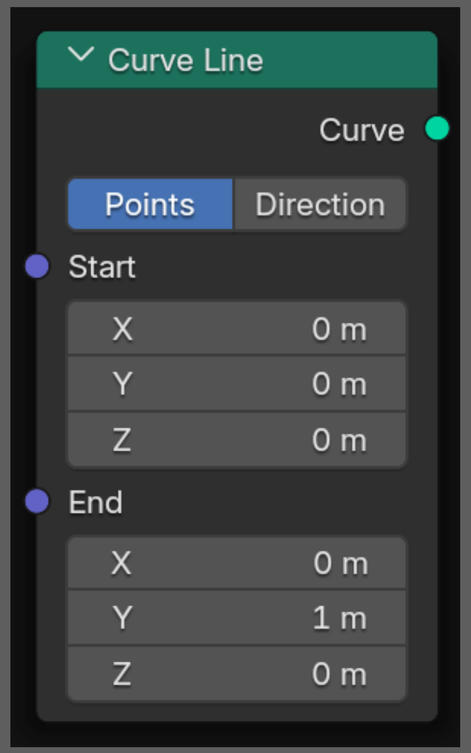


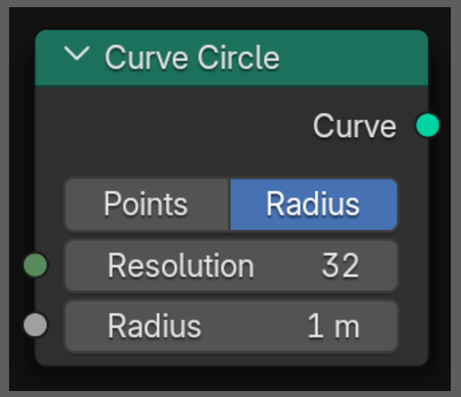


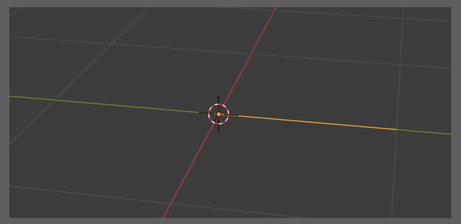


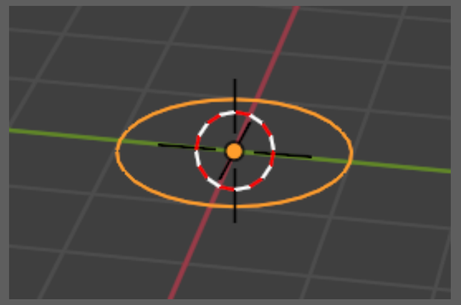


Curve Primitives



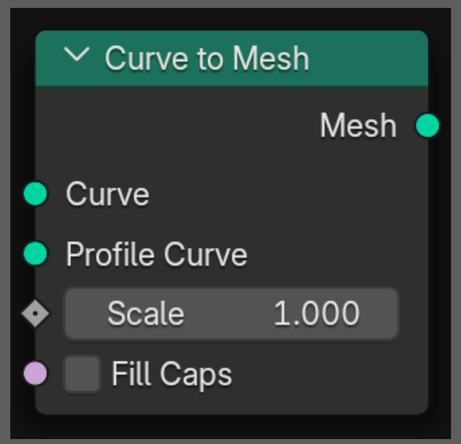


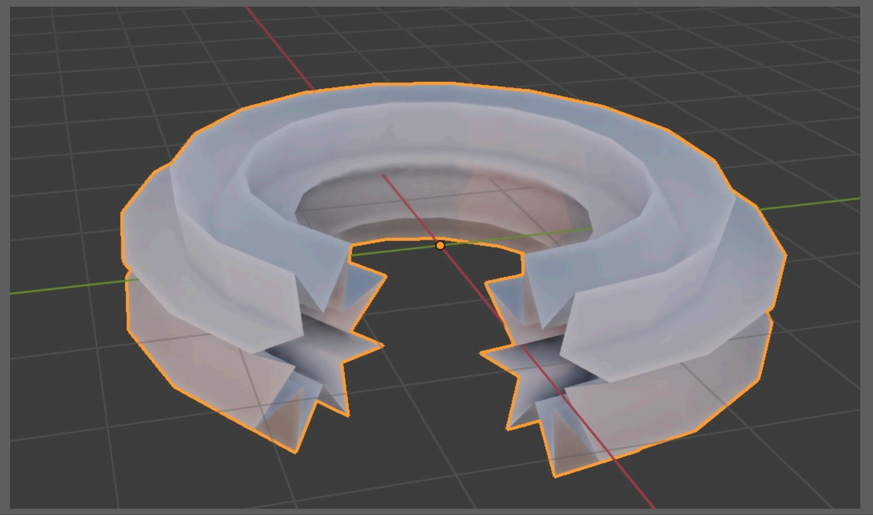


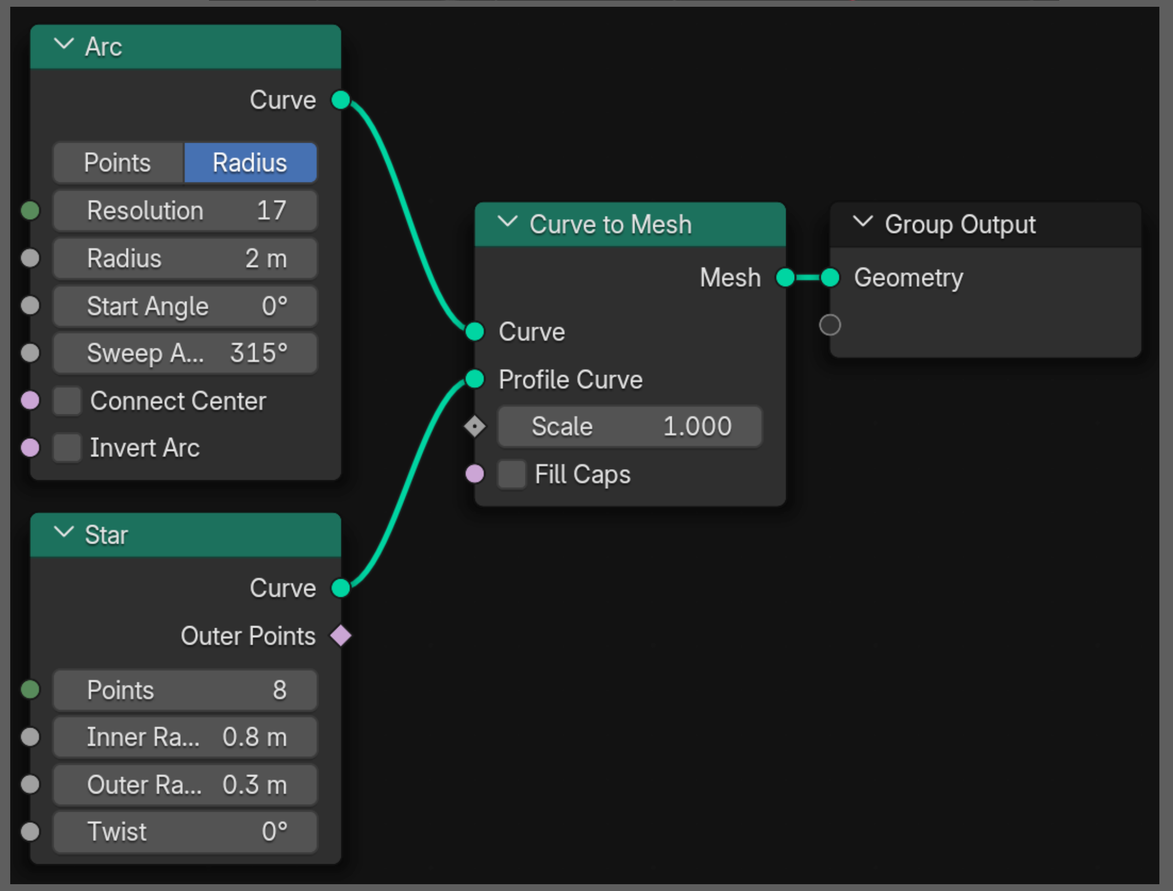


Curve Primitives

Curve to Mesh

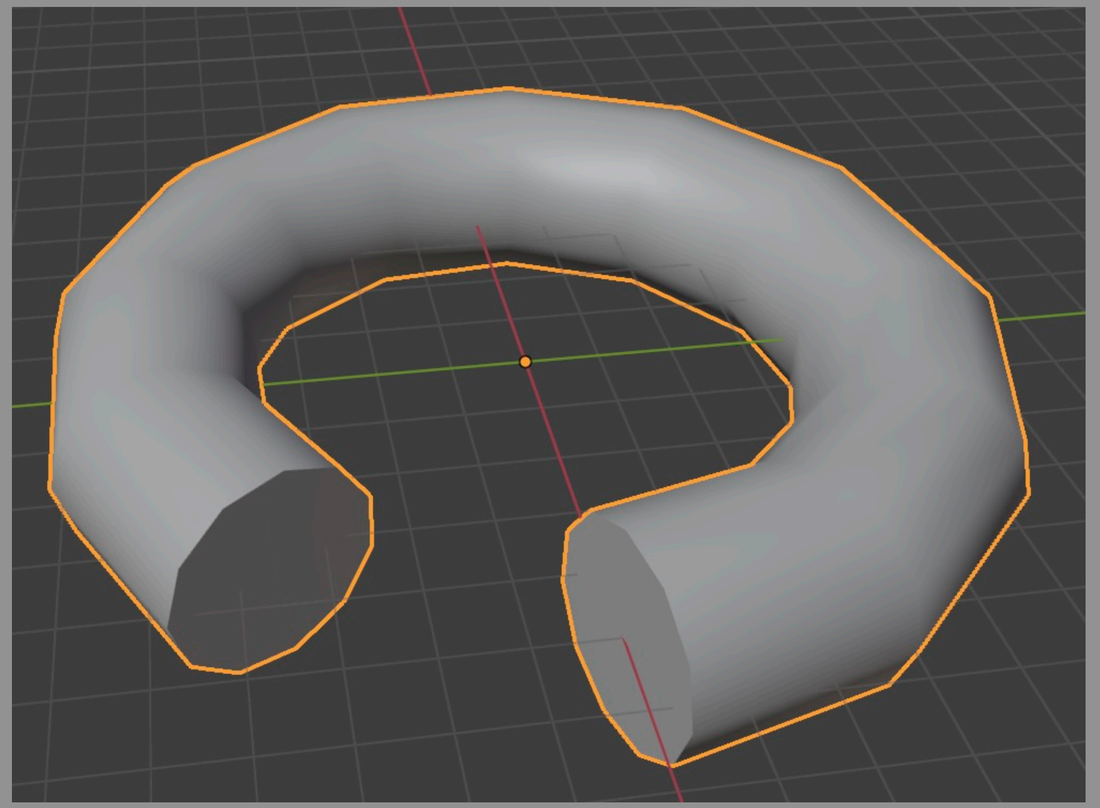






Curve Primitives

Task : Recreate this geometry

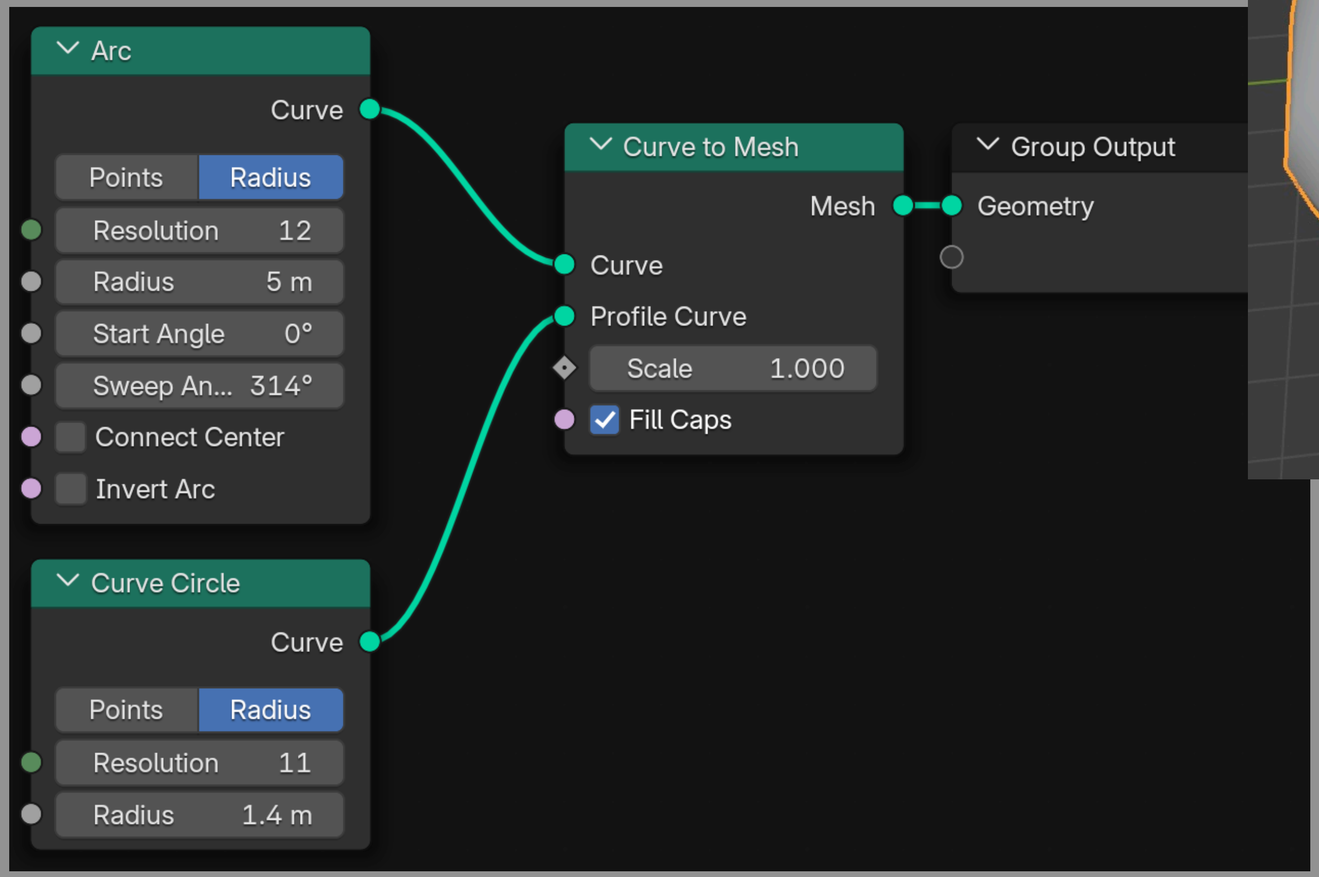


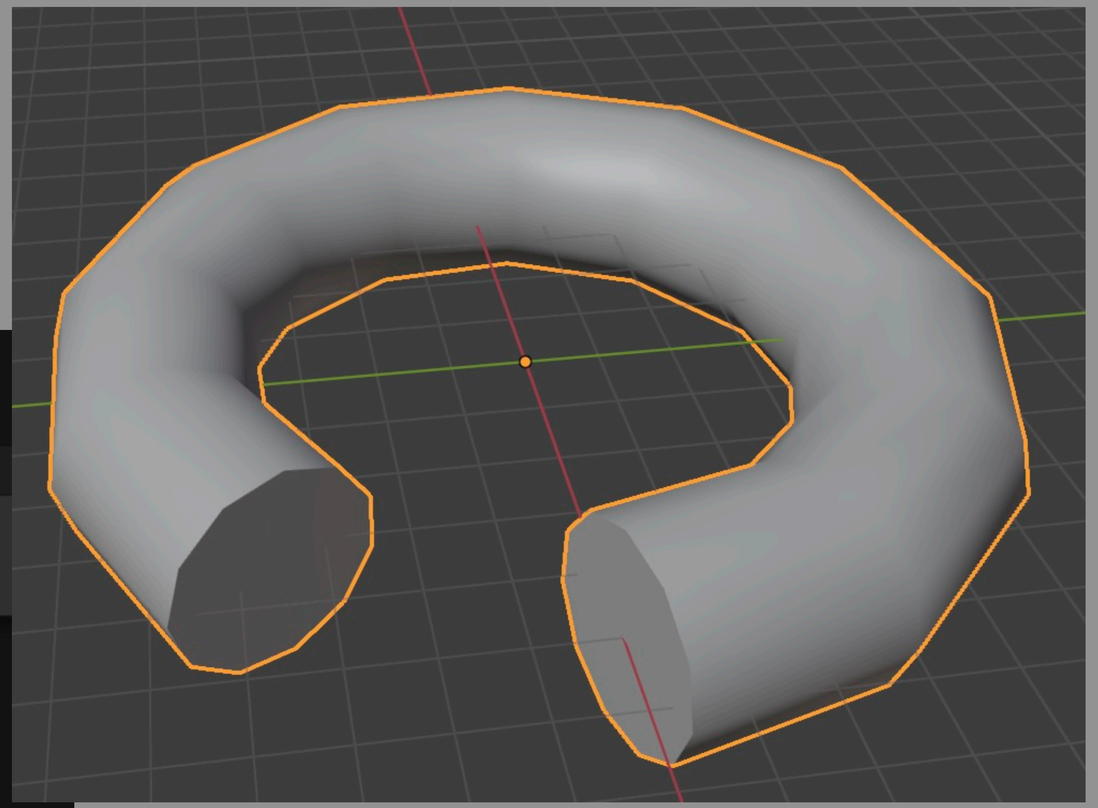
Use these nodes:

- Arc
- Curve Circle
- Curve to Mesh

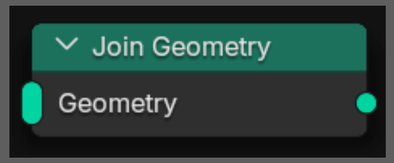
Curve Primitives

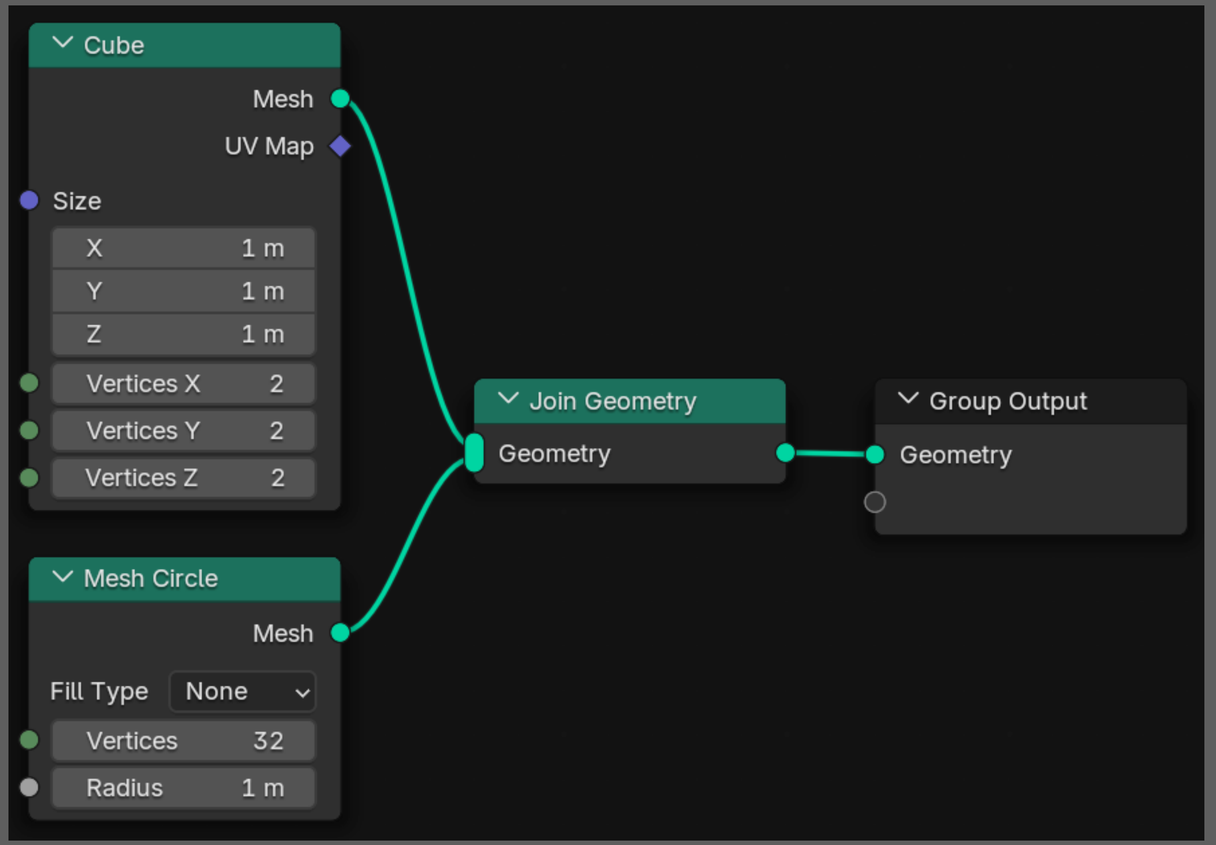
Solution

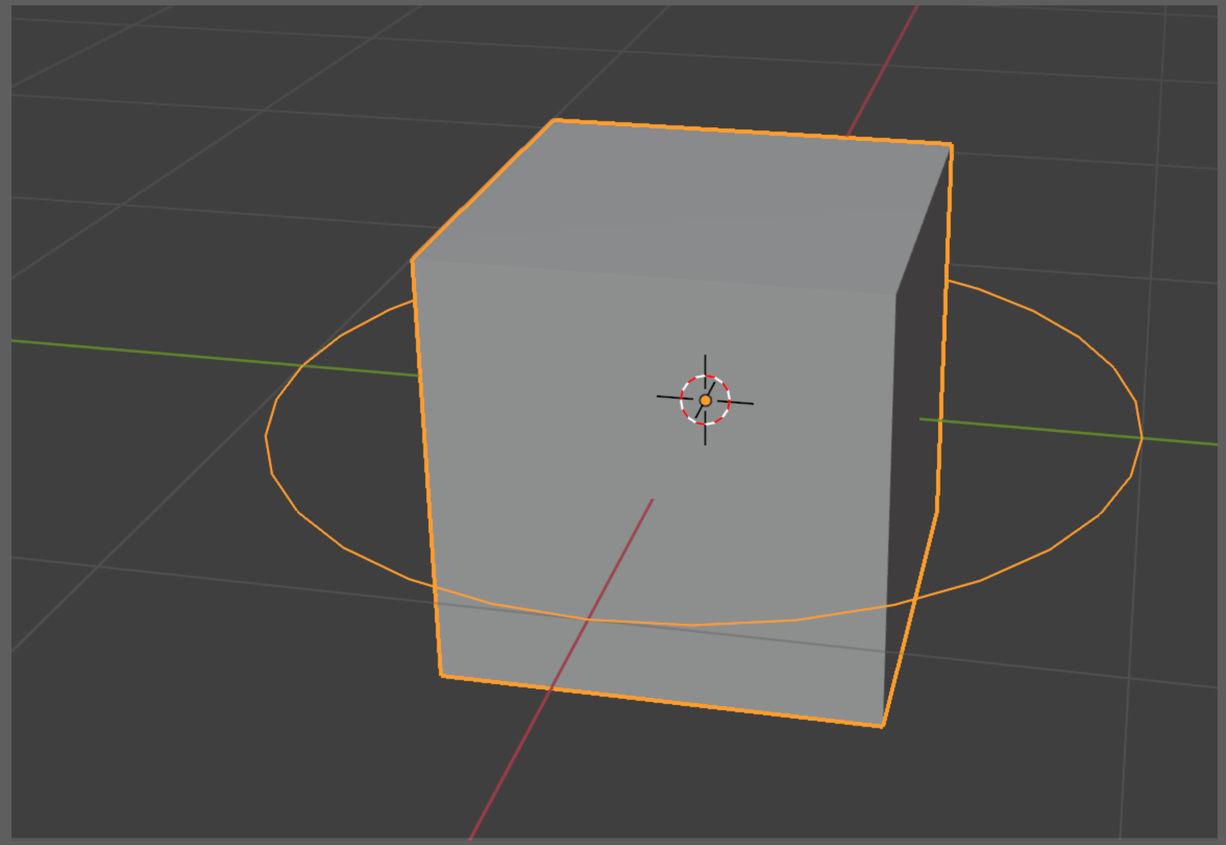




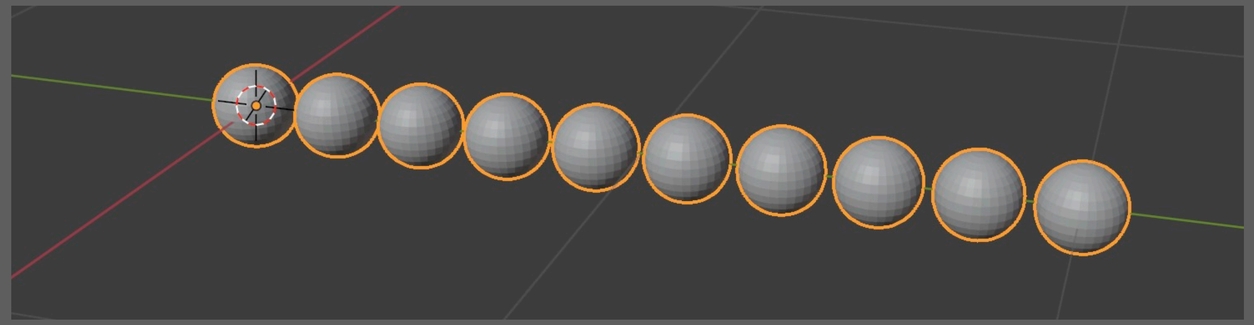
Join Geometry



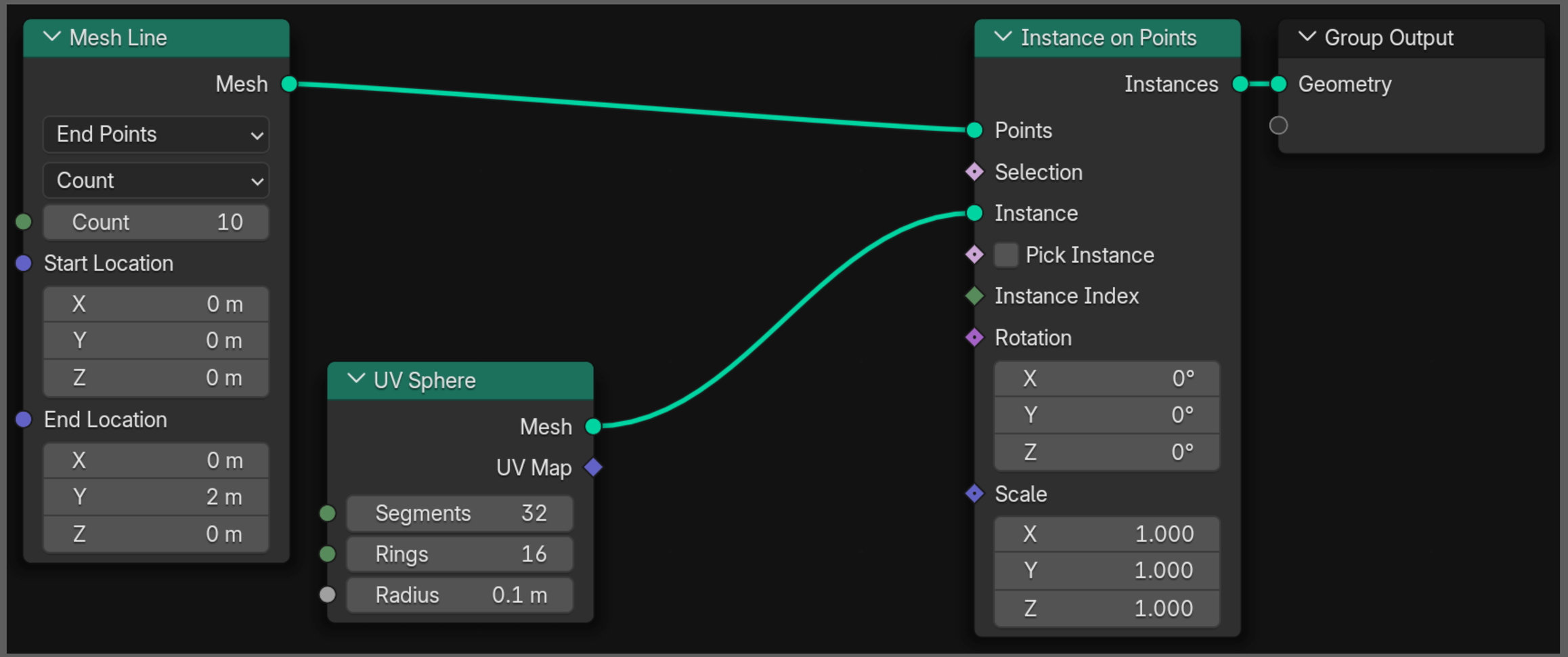




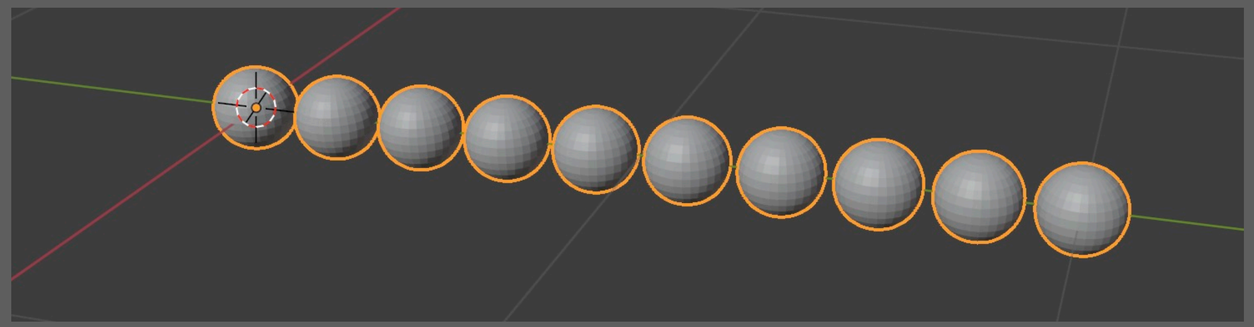
Instance on Points



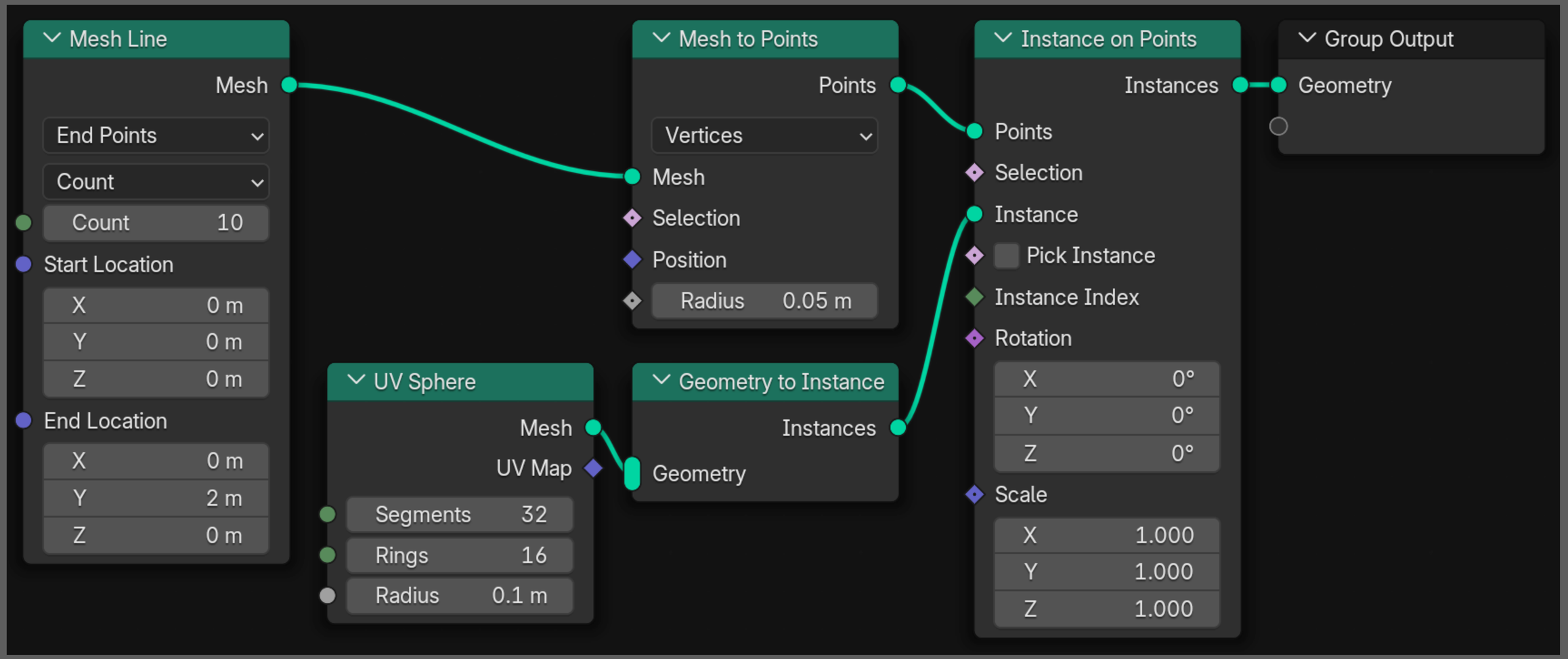
Short version



Instance on Points



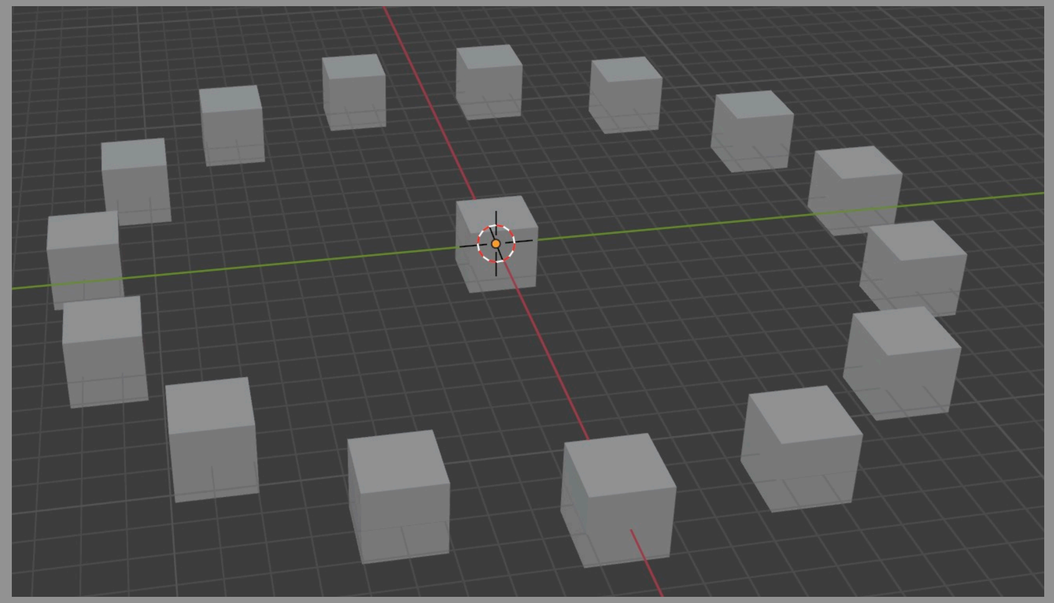
Long version

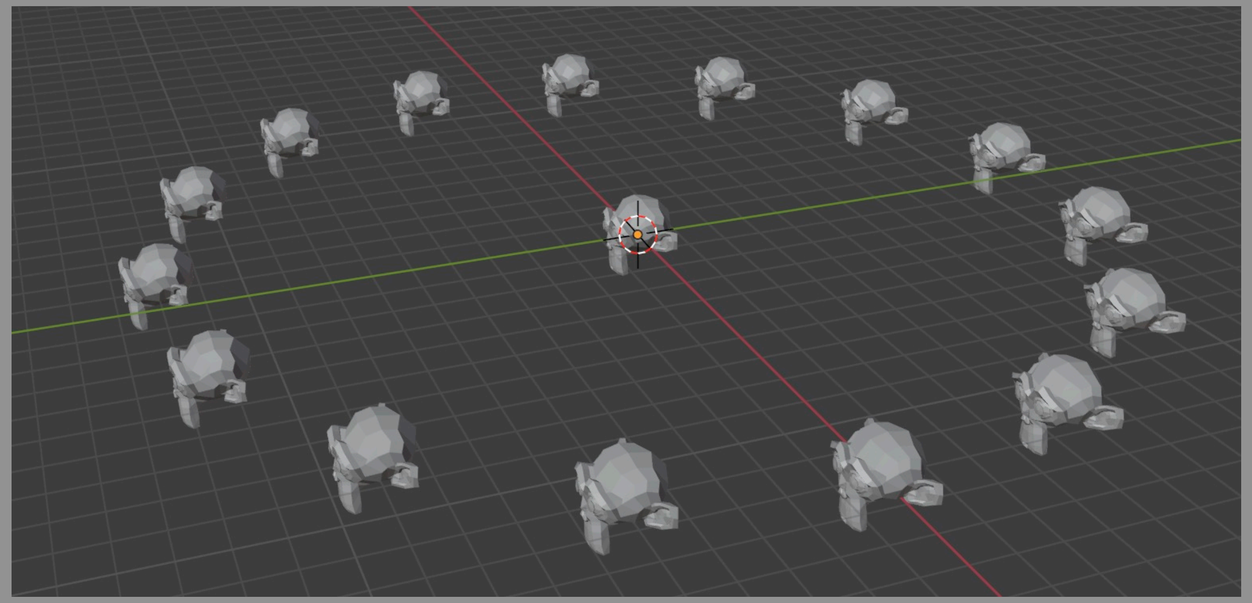


Node Navigation

- Shift + A -> Add node
- G → Grab nodes
- Click + Drag → Create noodle
- Command + Right Click + Drag → Remove noodle

Task: Create a „CircleAround“ Modifier



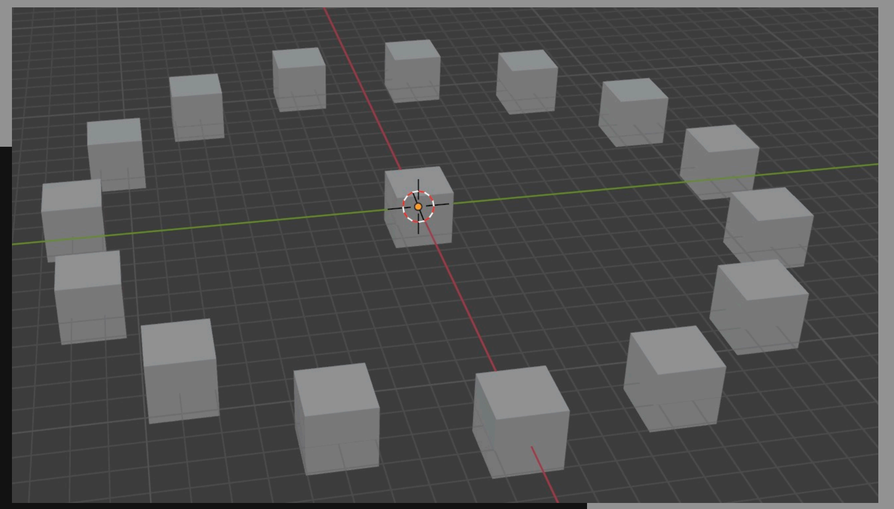


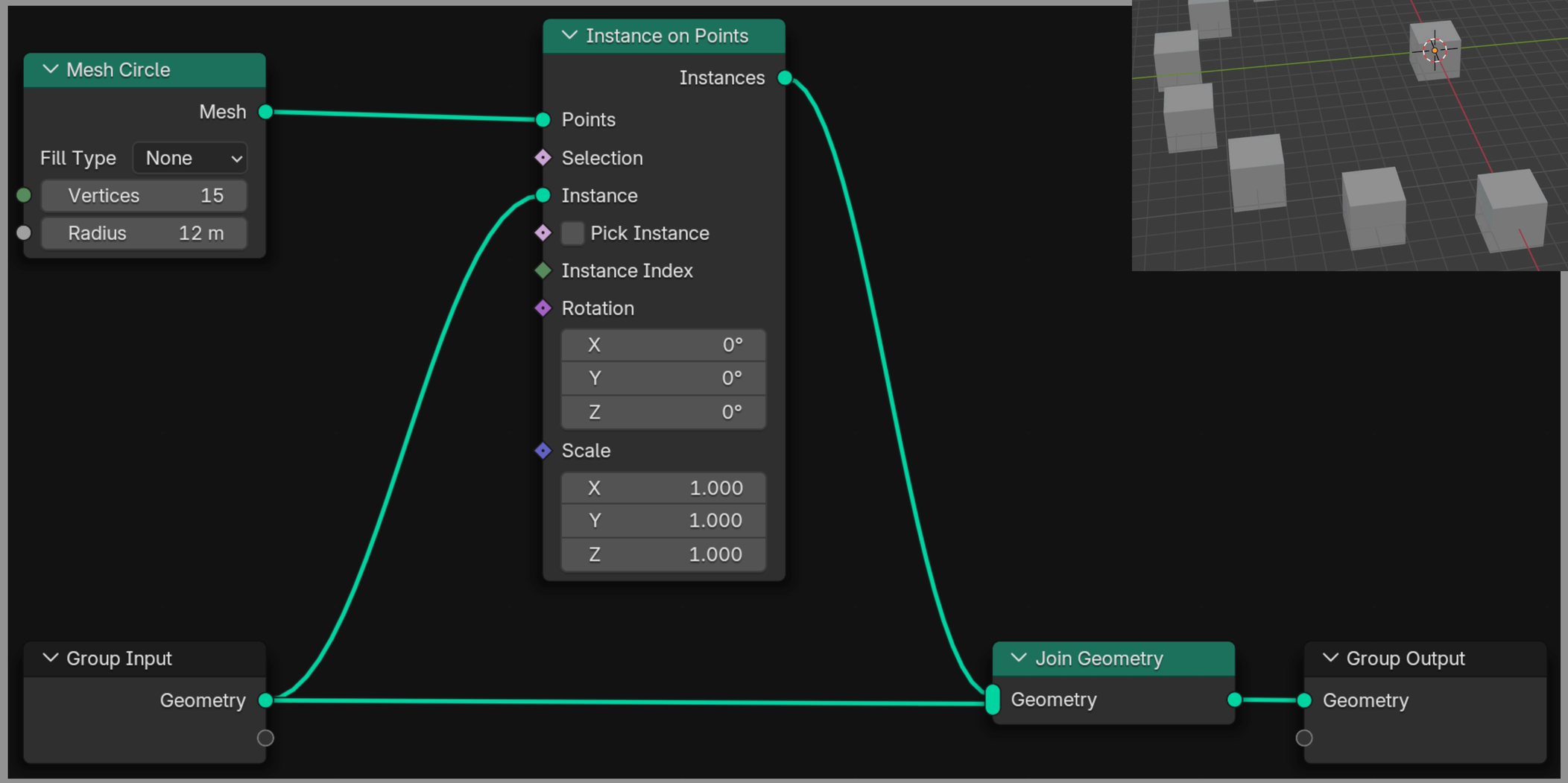
Use these nodes:

- Mesh Circle
- Instance on Points
- Join Geometry

Task 2: Apply it to two objects in your scene

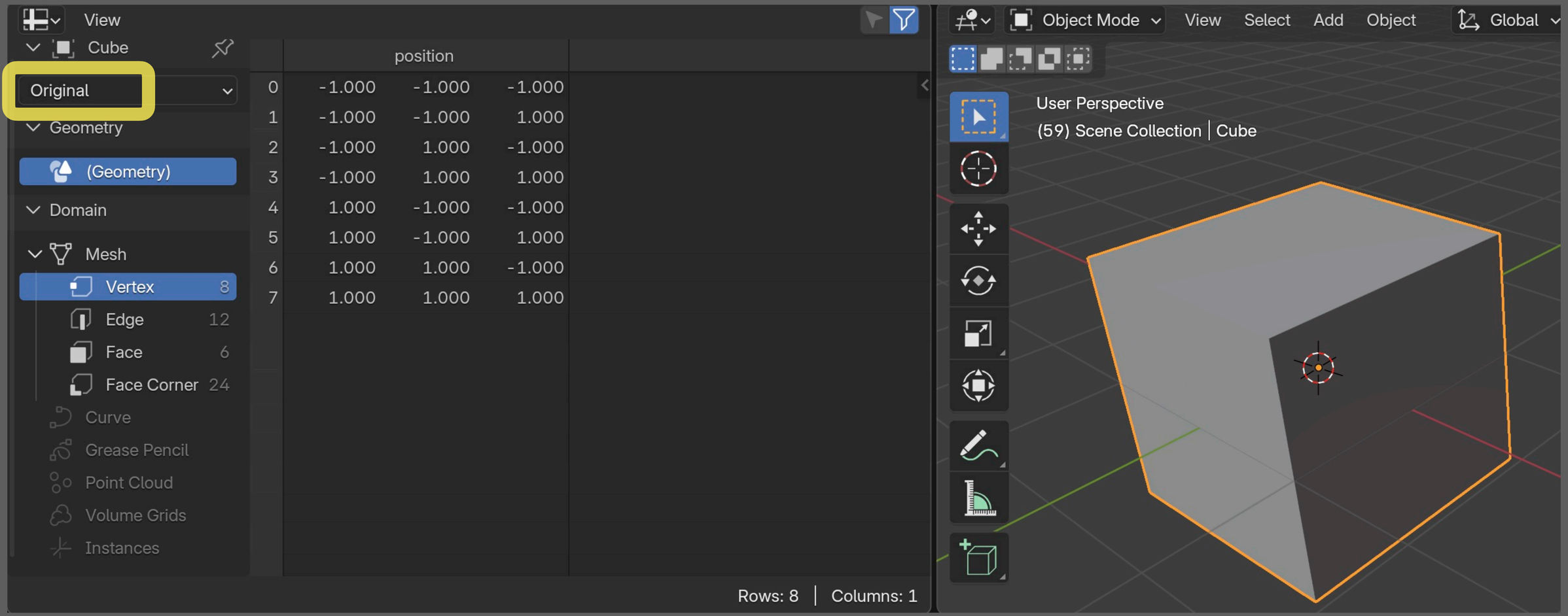
Task: Solution





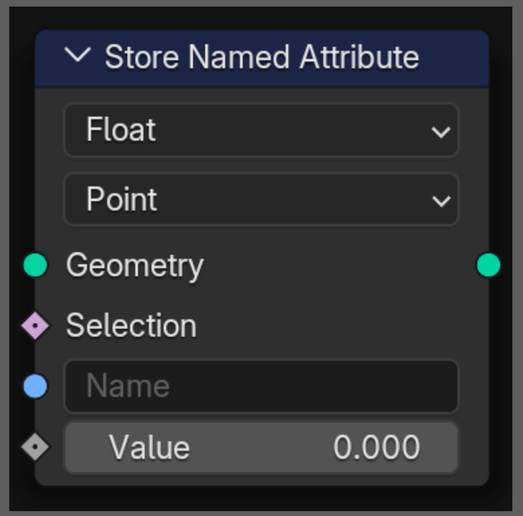
Spreadsheet

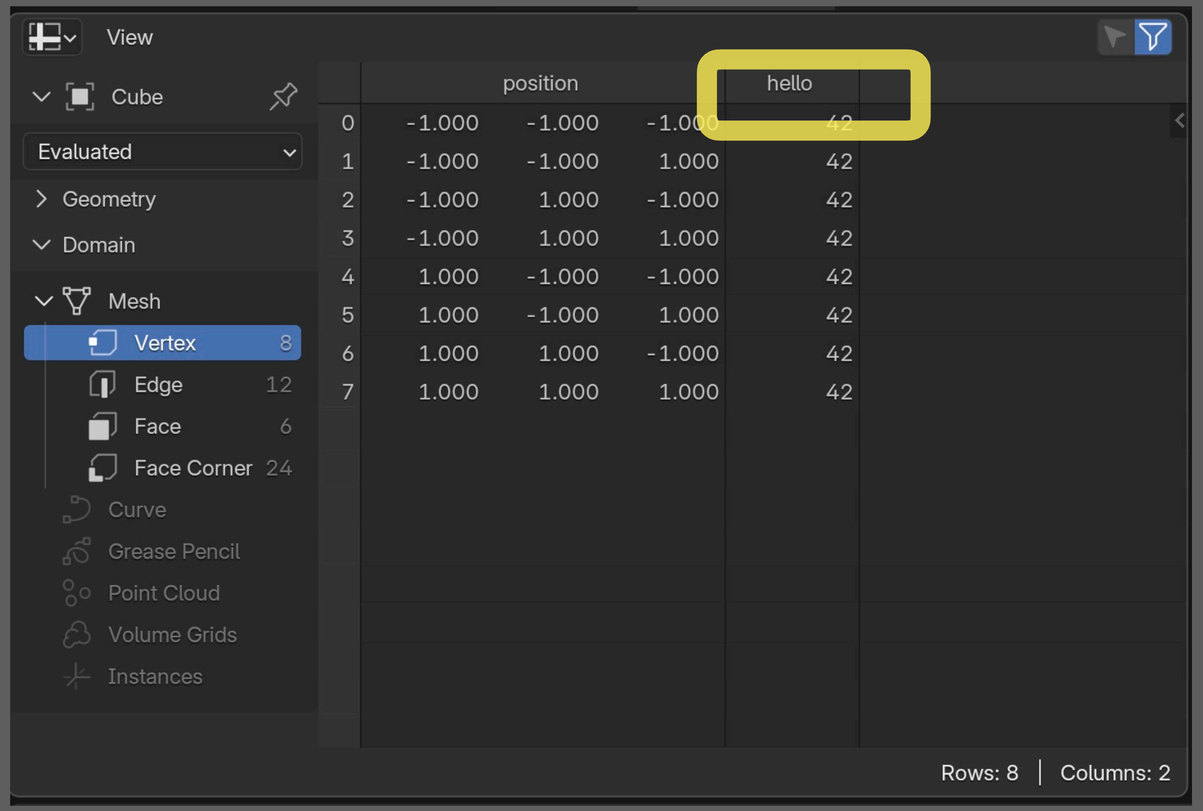
Both for „Original“ and „Evaluated“

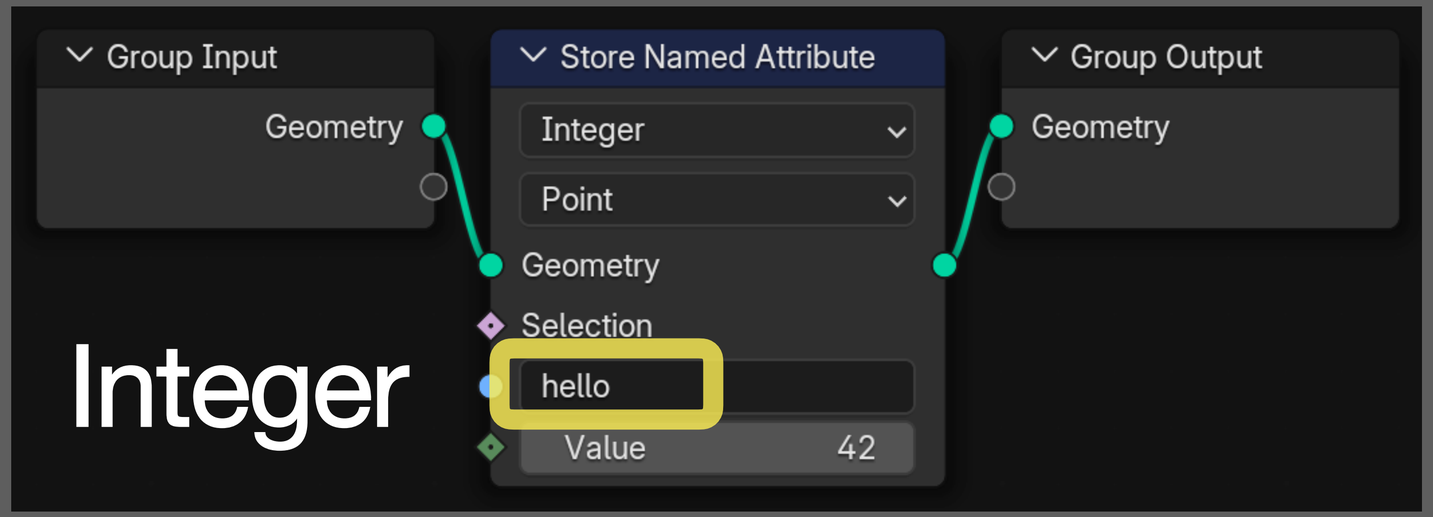


Spreadsheet

Store Named Attribute

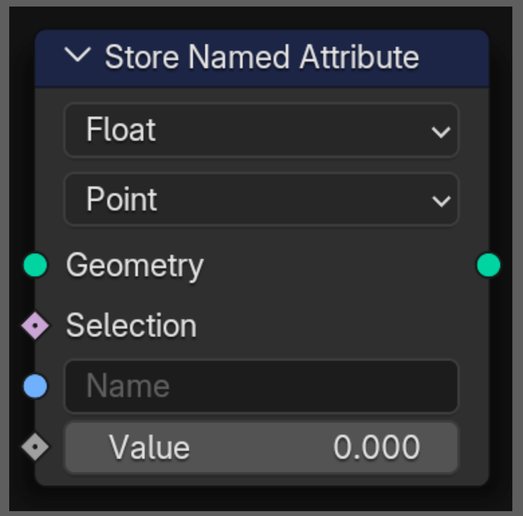


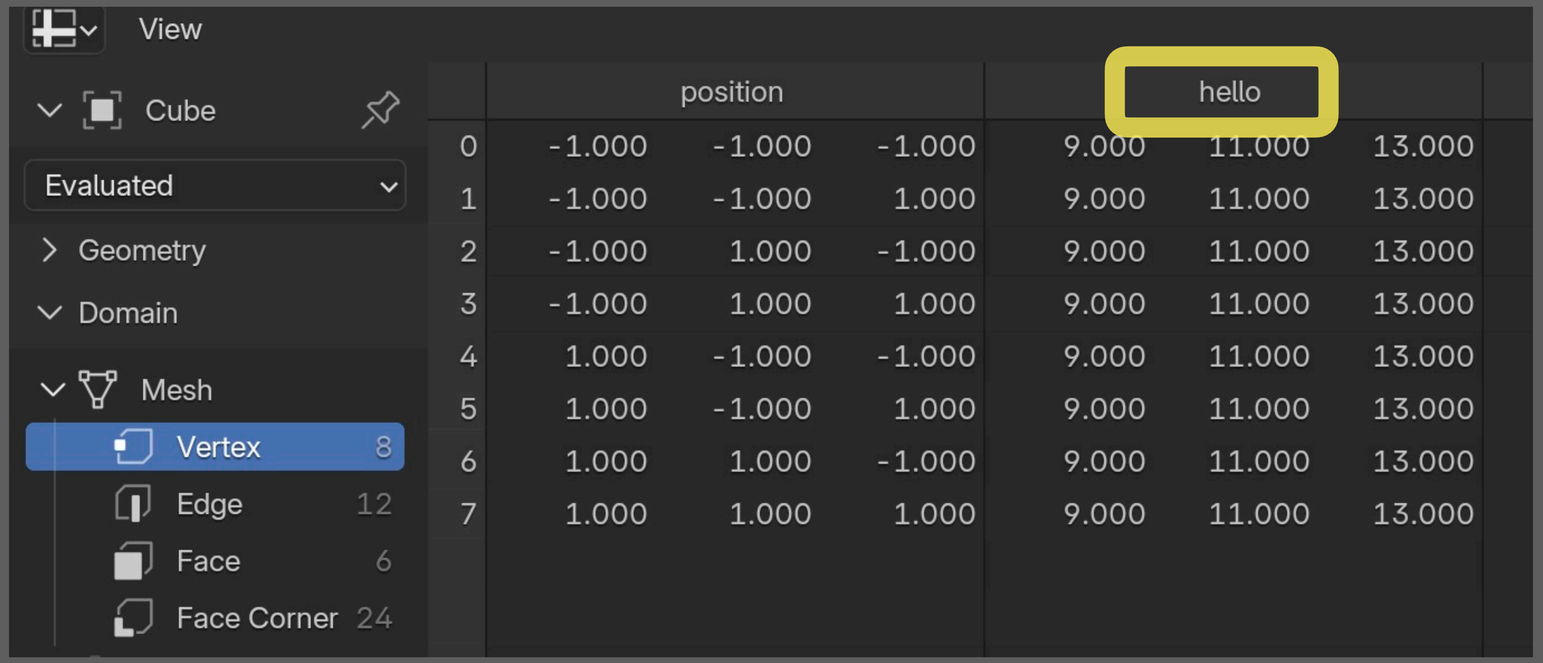


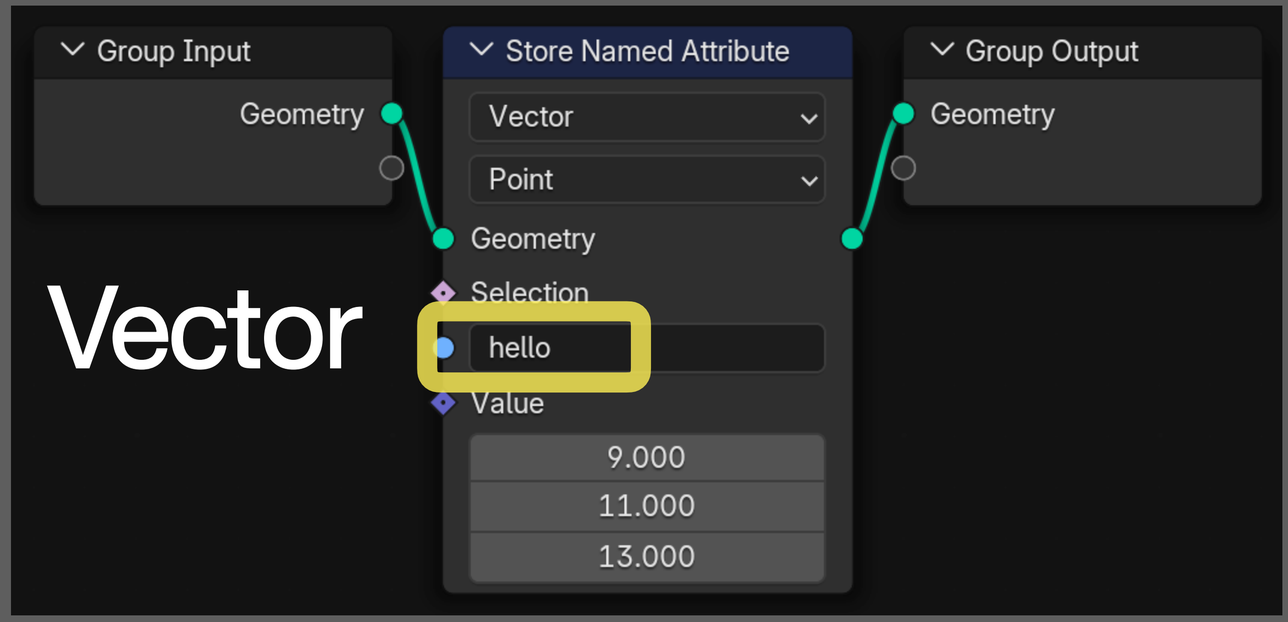


Spreadsheet

Store Named Attribute

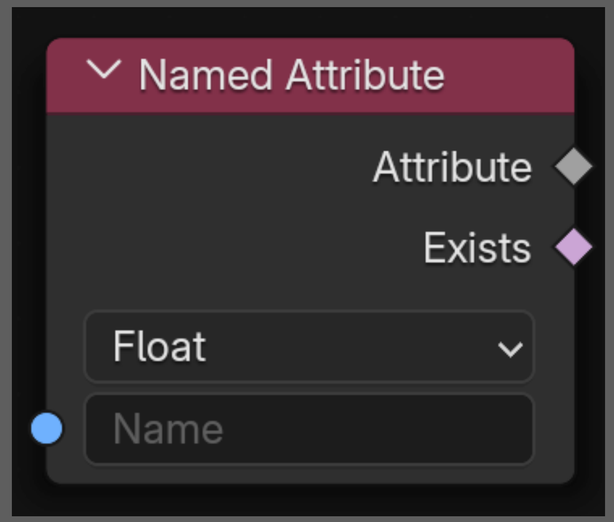


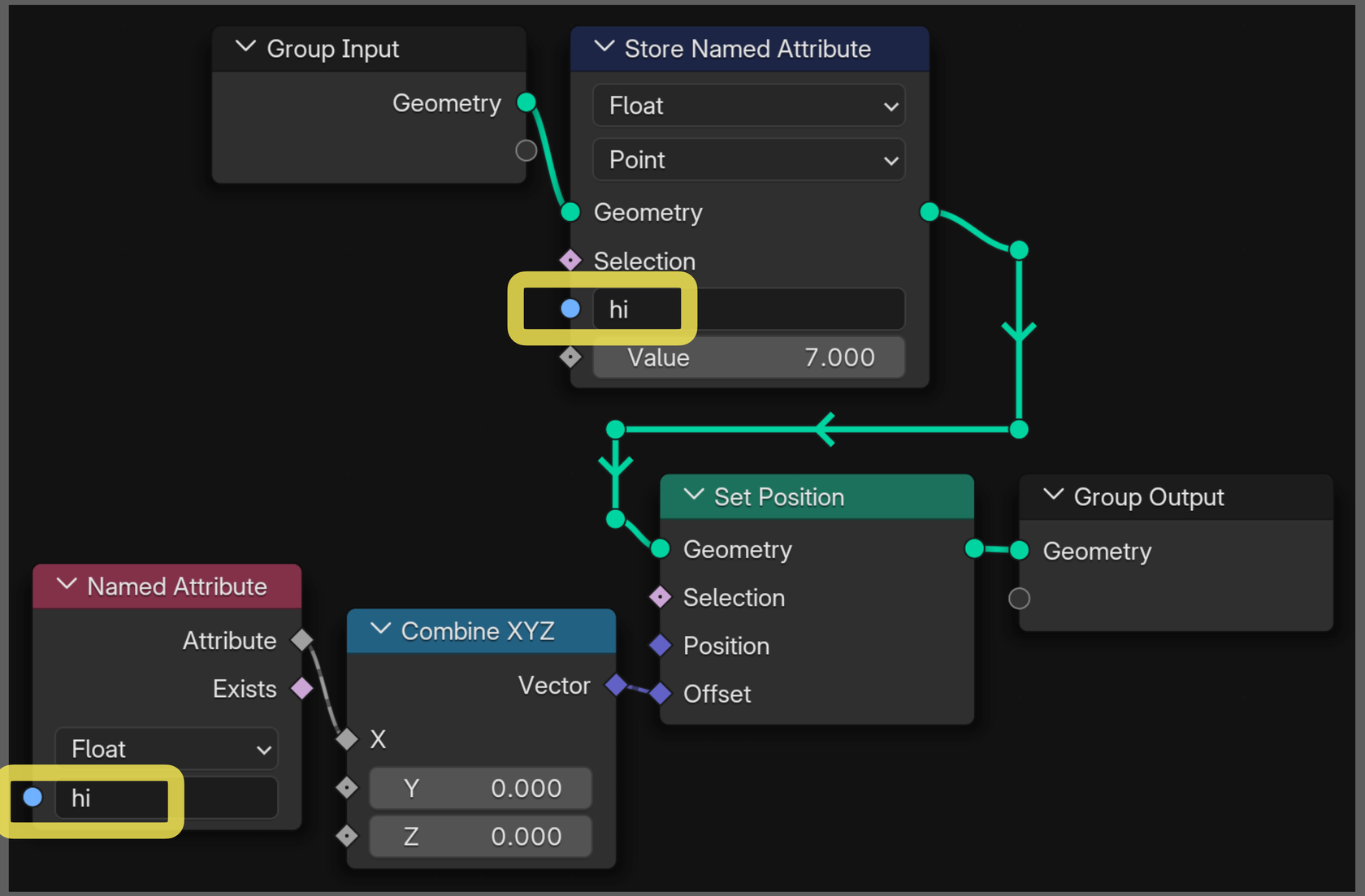




Spreadsheet

Named Attribute





Spreadsheet

Task: Create this spreadsheet

	position			bar	foo
0	-1.000	-1.000	-1.000	7.000	☑
1	-1.000	-1.000	1.000	7.000	☑
2	-1.000	1.000	-1.000	7.000	☑
3	-1.000	1.000	1.000	7.000	☑
4	1.000	-1.000	-1.000	7.000	☑
5	1.000	-1.000	1.000	7.000	☑
6	1.000	1.000	-1.000	7.000	☑
7	1.000	1.000	1.000	7.000	☑

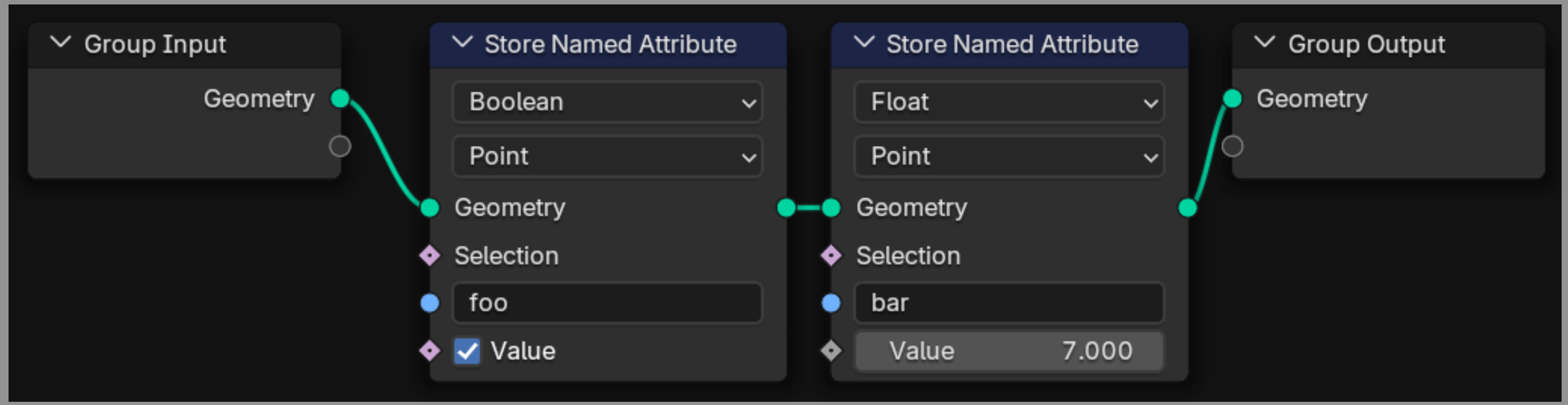
Use this node:

- Store Named Attribute

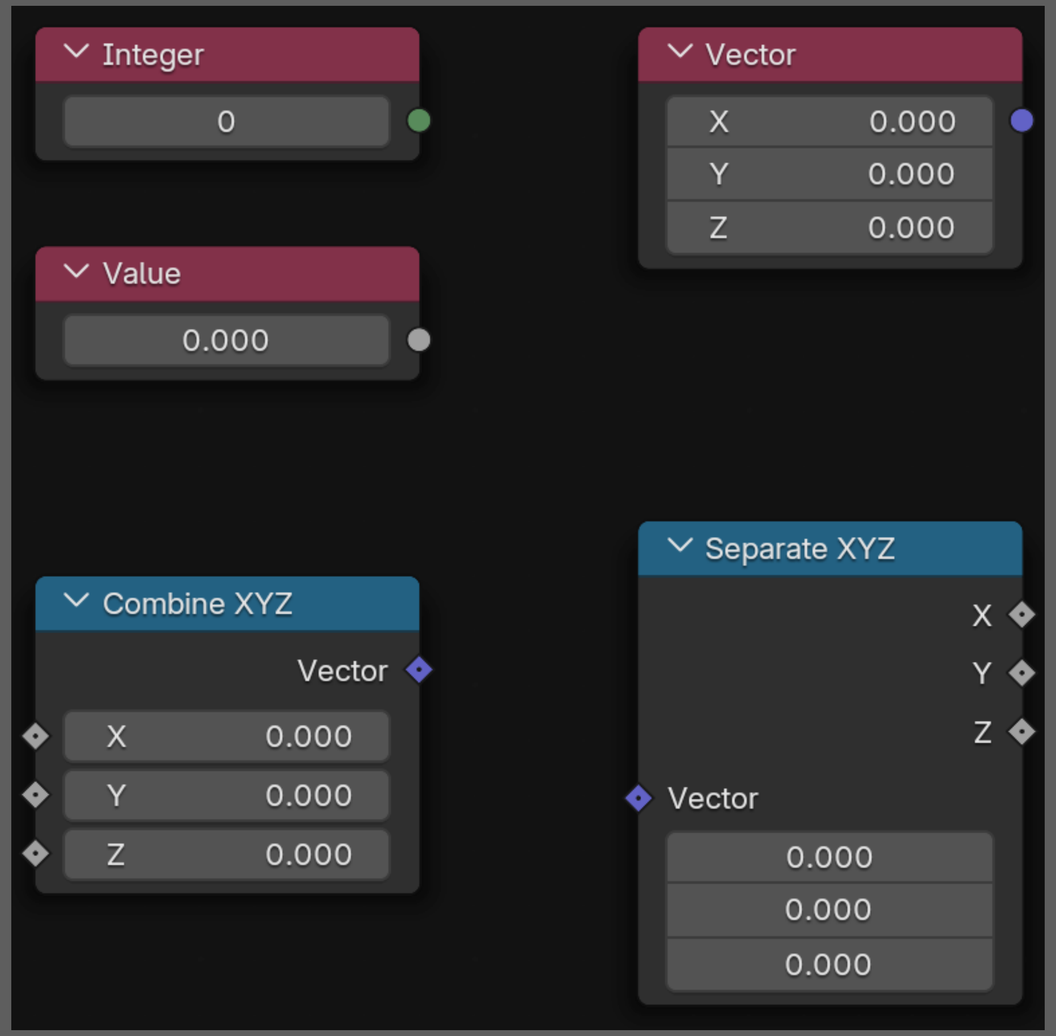
Spreadsheet

Solution

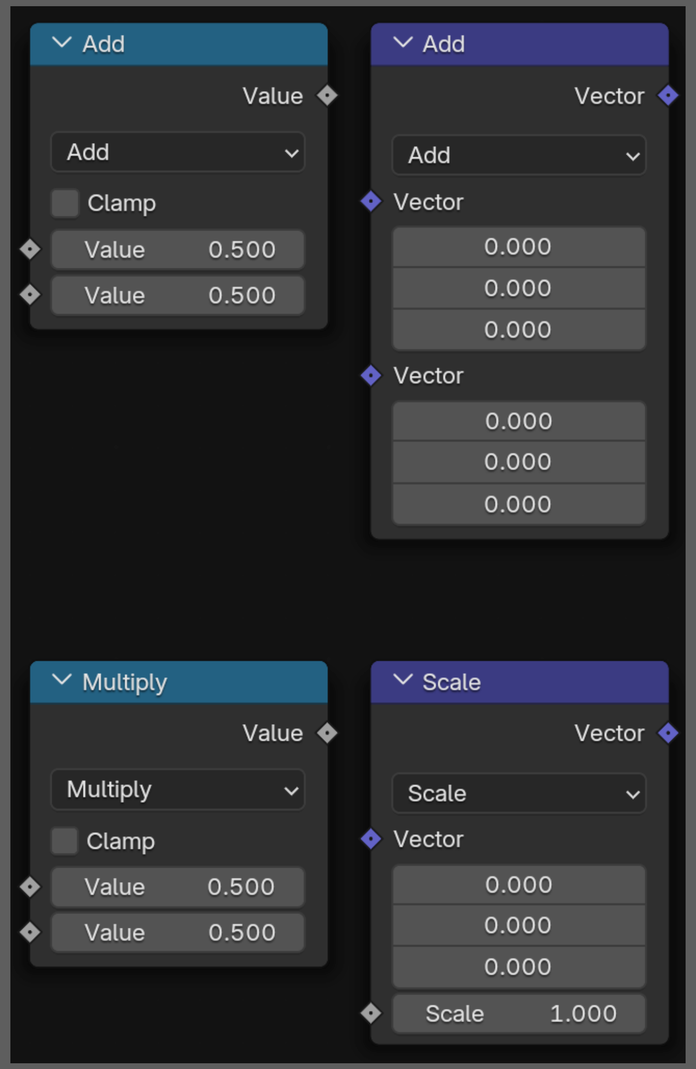
	position			bar	foo
0	-1.000	-1.000	-1.000	7.000	☑
1	-1.000	-1.000	1.000	7.000	☑
2	-1.000	1.000	-1.000	7.000	☑
3	-1.000	1.000	1.000	7.000	☑
4	1.000	-1.000	-1.000	7.000	☑
5	1.000	-1.000	1.000	7.000	☑
6	1.000	1.000	-1.000	7.000	☑
7	1.000	1.000	1.000	7.000	☑



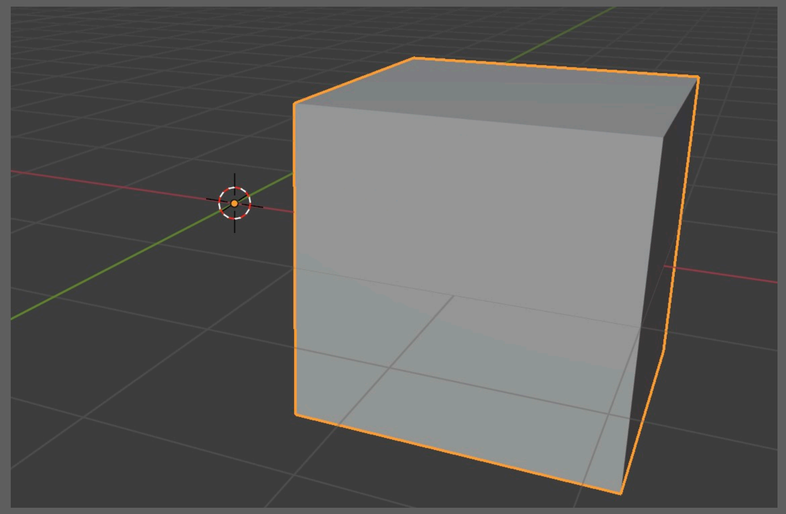
Math & Vector

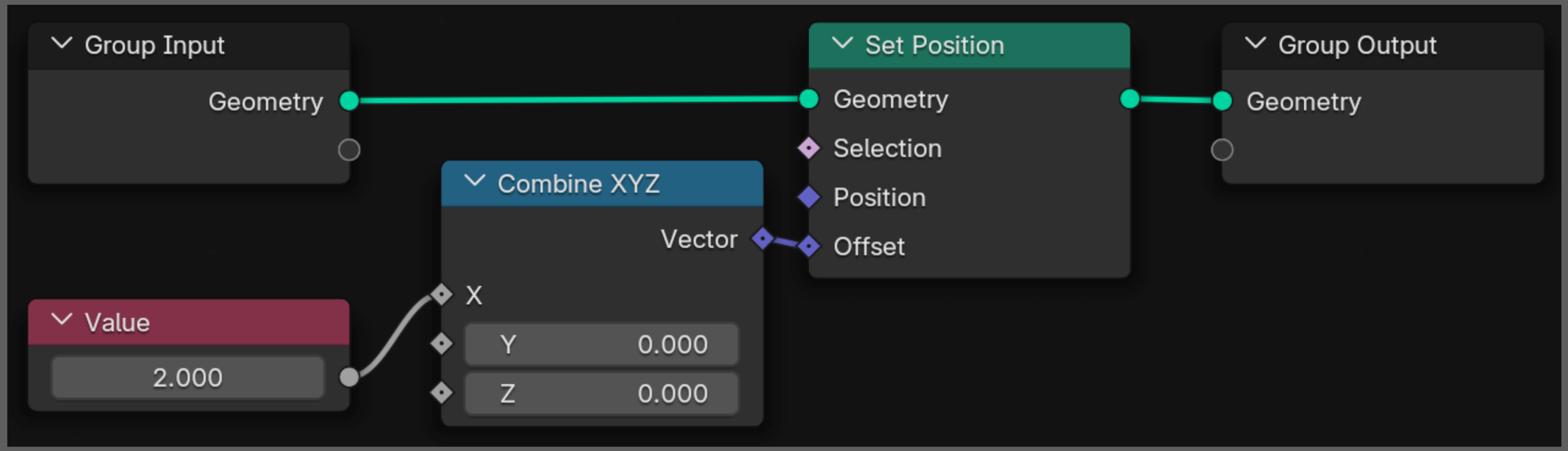

Integer
0
Vector
X 0.000
Y 0.000
Z 0.000
Value
0.000
Separate XYZ
X
Y
Z
Combine XYZ
Vector
X 0.000
Y 0.000
Z 0.000
Vector
0.000
0.000
0.000

Math & Vector

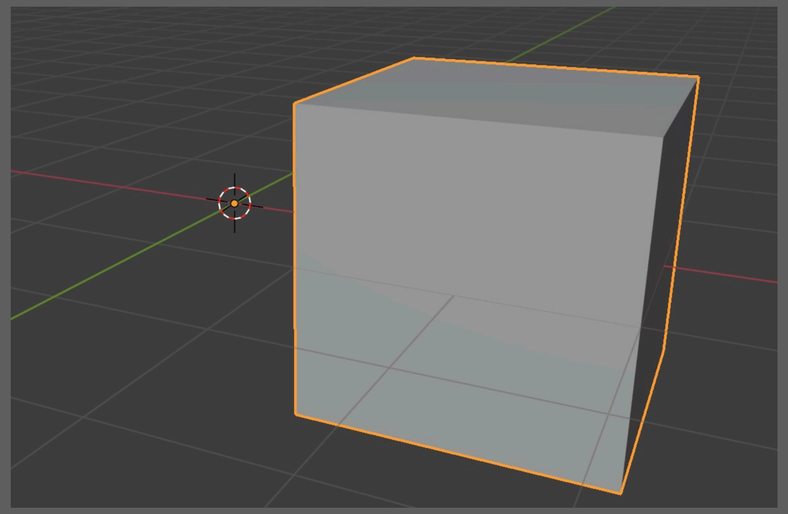

Add
Value
Add
Clamp
Value 0.500
Value 0.500
Add
Vector
Add
Vector
0.000
0.000
0.000
Vector
0.000
0.000
0.000
Multiply
Value
Multiply
Clamp
Value 0.500
Value 0.500
Scale
Vector
Scale
Vector
0.000
0.000
0.000
Scale 1.000

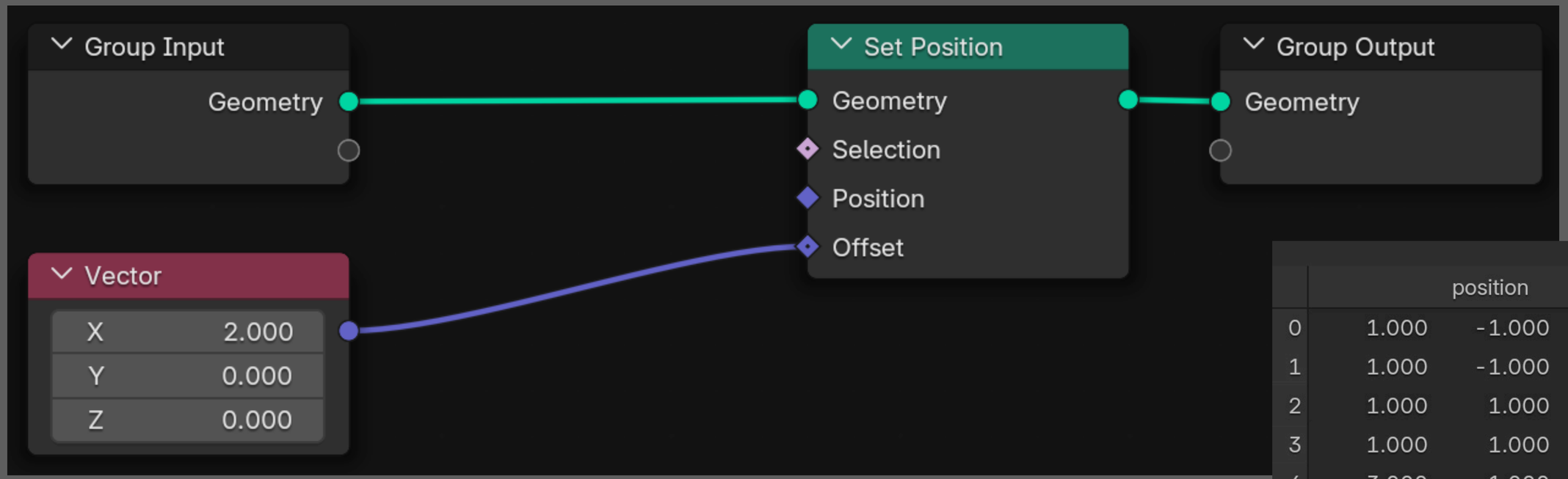
Math & Vector




Group Input
Geometry
Set Position
Geometry
Selection
Position
Offset
Group Output
Geometry
Combine XYZ
Vector
X
Y 0.000
Z 0.000
Value
2.000

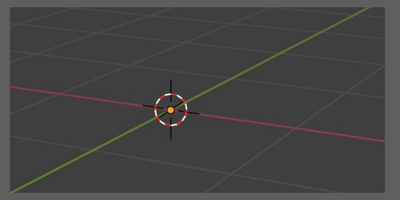
Math & Vector

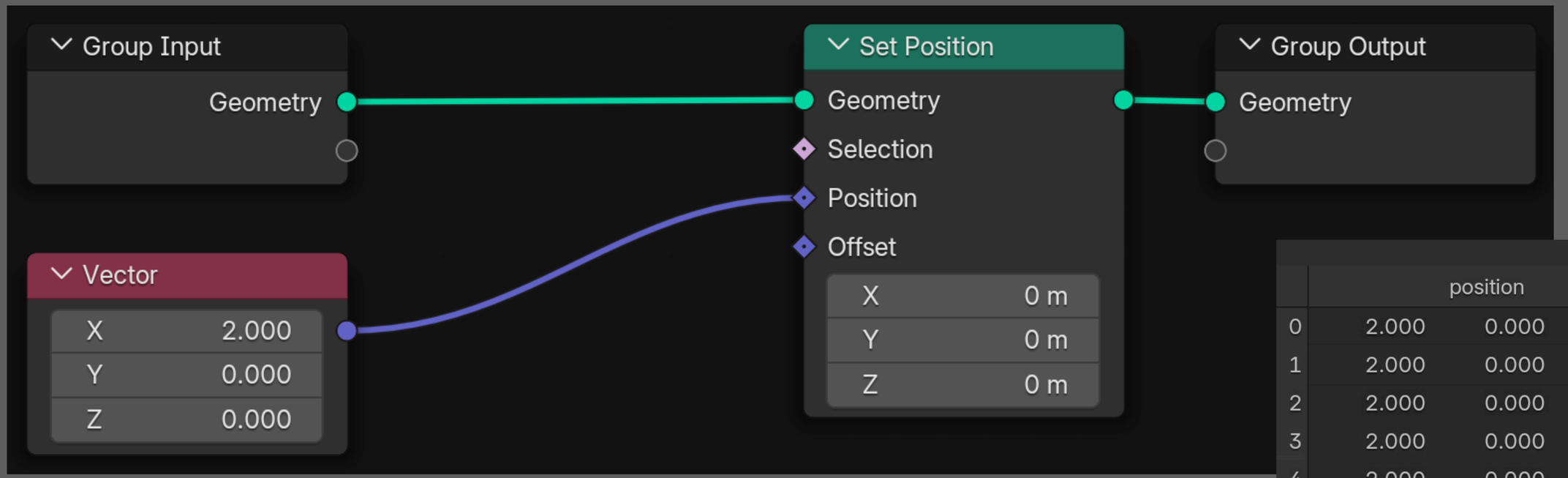




	position		
0	1.000	-1.000	-1.000
1	1.000	-1.000	1.000
2	1.000	1.000	-1.000
3	1.000	1.000	1.000
4	3.000	-1.000	-1.000
5	3.000	-1.000	1.000
6	3.000	1.000	-1.000
7	3.000	1.000	1.000

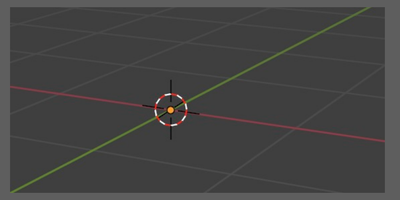
Math & Vector

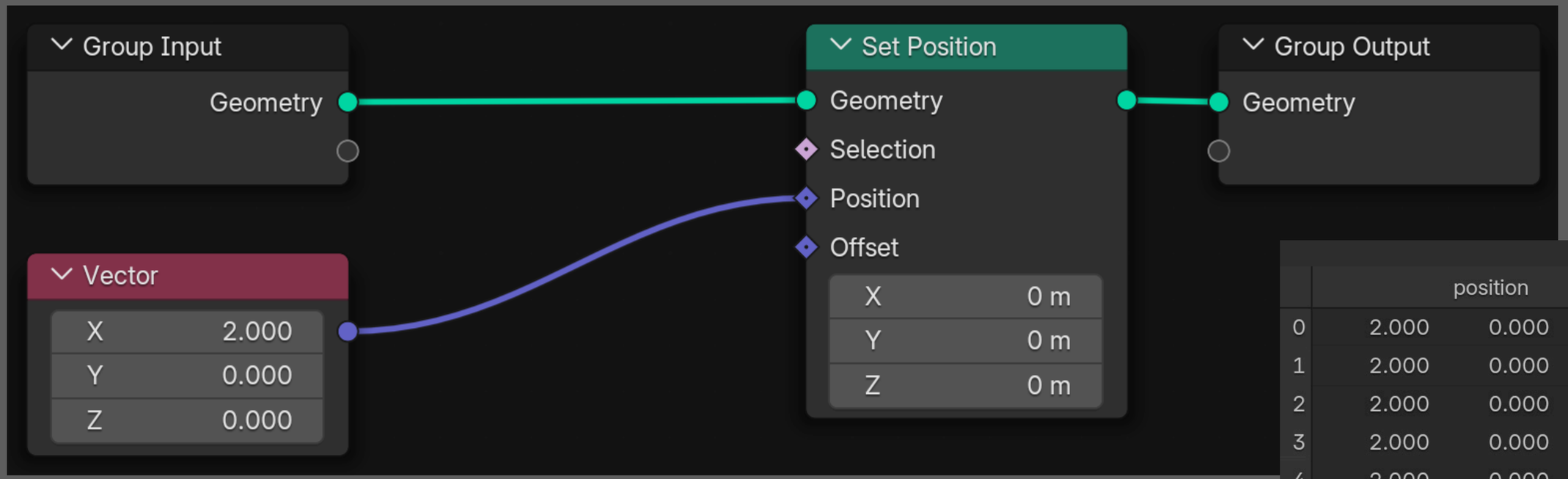




	position		
0	2.000	0.000	0.000
1	2.000	0.000	0.000
2	2.000	0.000	0.000
3	2.000	0.000	0.000
4	2.000	0.000	0.000
5	2.000	0.000	0.000
6	2.000	0.000	0.000
7	2.000	0.000	0.000

Math & Vector

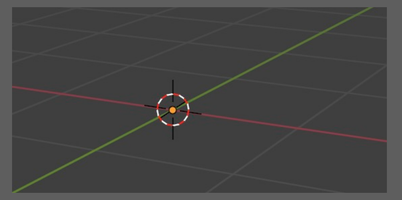


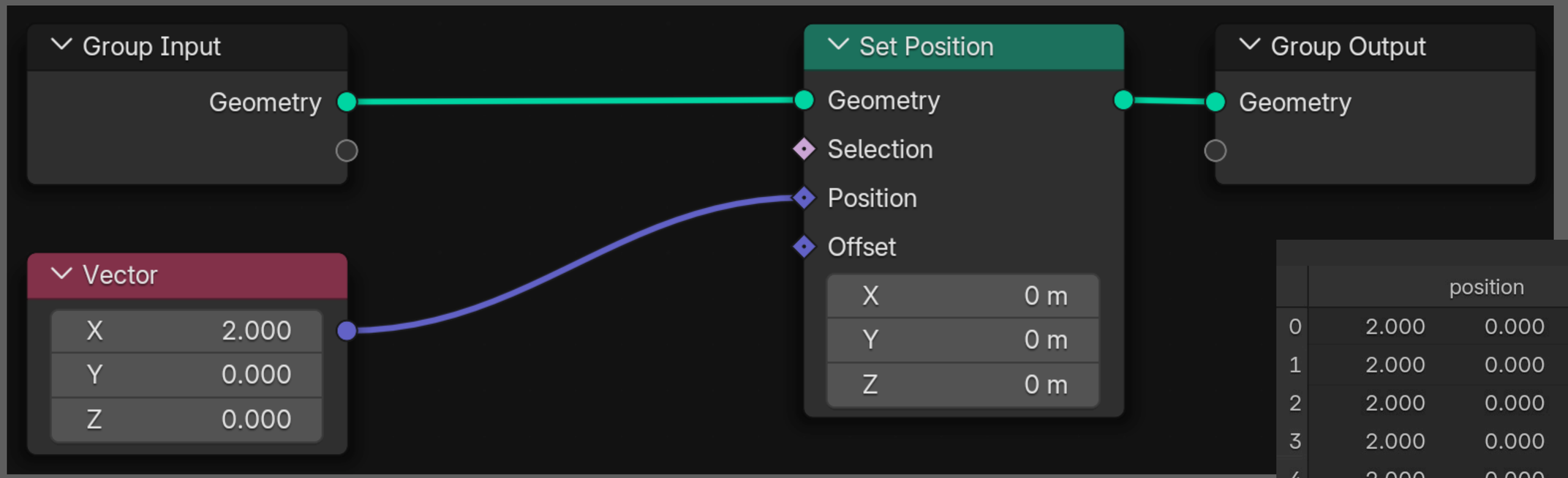


	position		
0	2.000	0.000	0.000
1	2.000	0.000	0.000
2	2.000	0.000	0.000
3	2.000	0.000	0.000
4	2.000	0.000	0.000
5	2.000	0.000	0.000
6	2.000	0.000	0.000
7	2.000	0.000	0.000

Can we use the position as an input?

Math & Vector





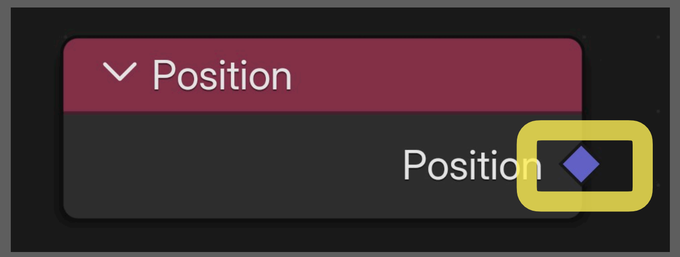
	position		
0	2.000	0.000	0.000
1	2.000	0.000	0.000
2	2.000	0.000	0.000
3	2.000	0.000	0.000
4	2.000	0.000	0.000
5	2.000	0.000	0.000
6	2.000	0.000	0.000
7	2.000	0.000	0.000

Can we use the position as an input?
Yes, we can, with Fields!

Values vs. Fields

So far:
Output socket is **round** (Value Socket)
- One value for whole geometry or
- One vector for whole geometry

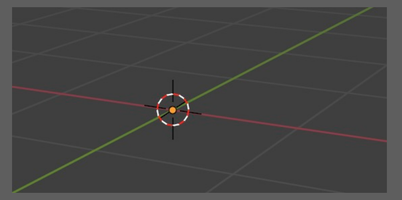
$$[2.0 \quad 3.0 \quad 4.0]$$

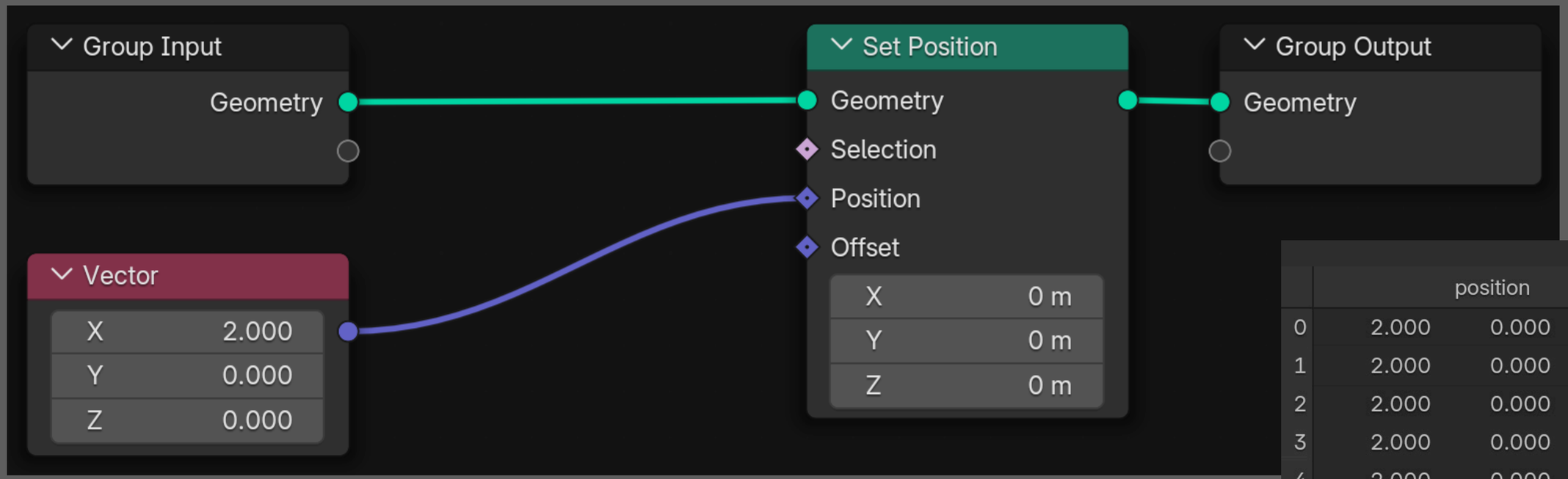


Now:
Output socket is **diamond-shaped** (Field Socket)
- A value that can be different for each element
- A vector that can be different for each element

$$\begin{bmatrix} -1.0 & -1.0 & -1.0 \\ -1.0 & -1.0 & 1.0 \\ -1.0 & 1.0 & -1.0 \\ -1.0 & 1.0 & 1.0 \\ 1.0 & -1.0 & -1.0 \\ 1.0 & -1.0 & 1.0 \\ 1.0 & 1.0 & -1.0 \\ 1.0 & 1.0 & 1.0 \end{bmatrix}$$

Values vs. Fields



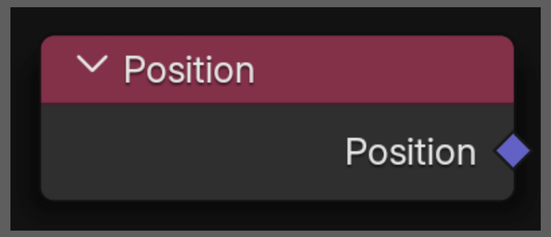


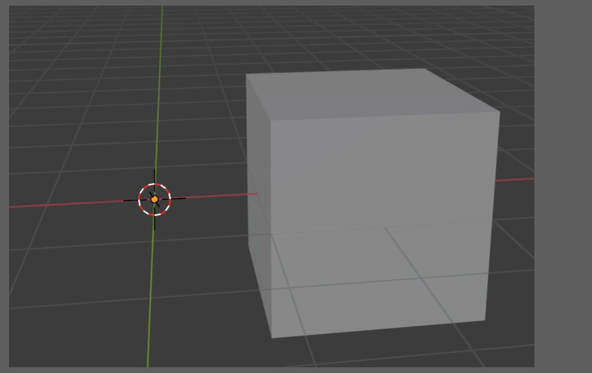
	position		
0	2.000	0.000	0.000
1	2.000	0.000	0.000
2	2.000	0.000	0.000
3	2.000	0.000	0.000
4	2.000	0.000	0.000
5	2.000	0.000	0.000
6	2.000	0.000	0.000
7	2.000	0.000	0.000

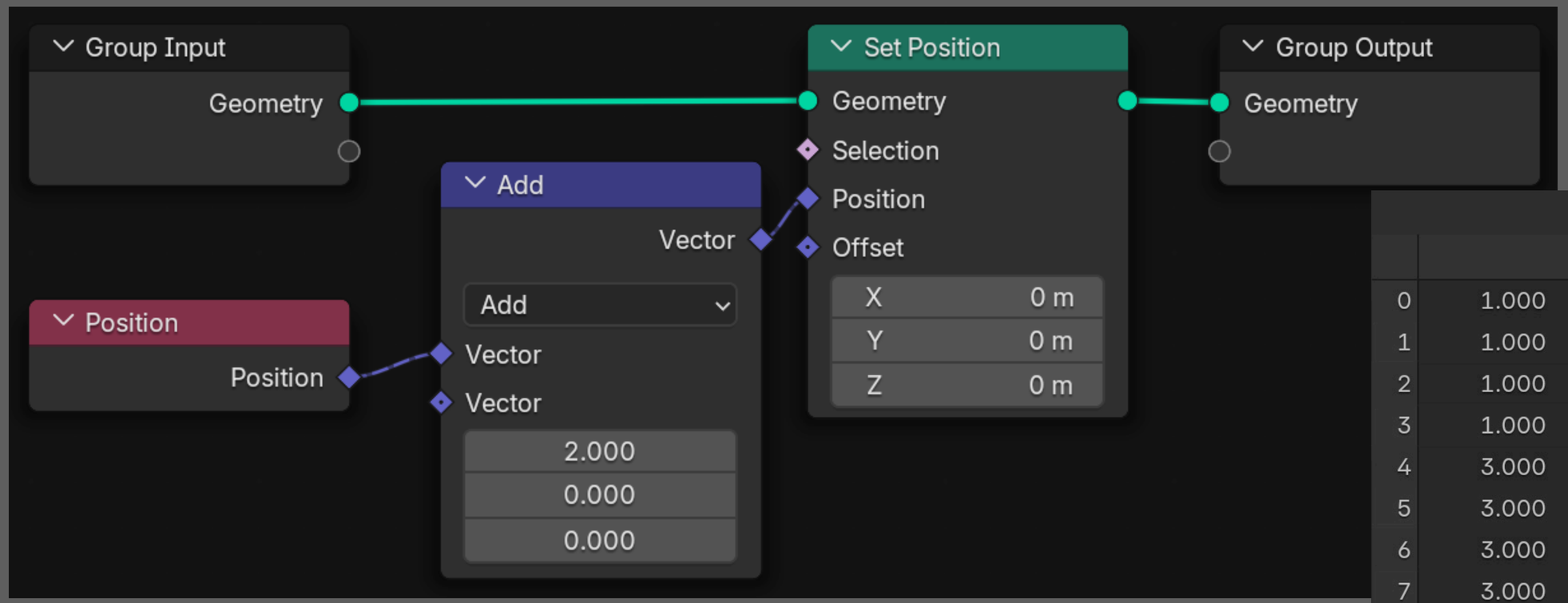
Can we use the position as an input?
Here's how!

Values vs. Fields

Read Position Node



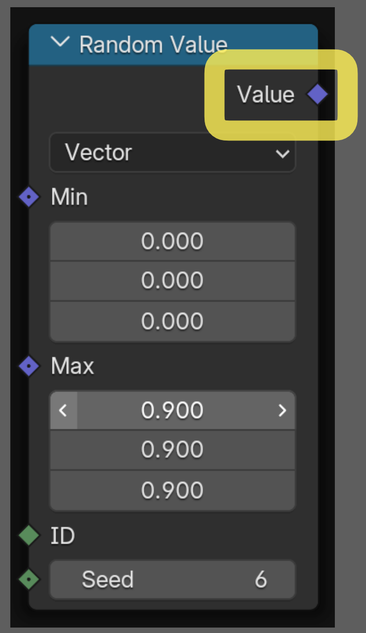


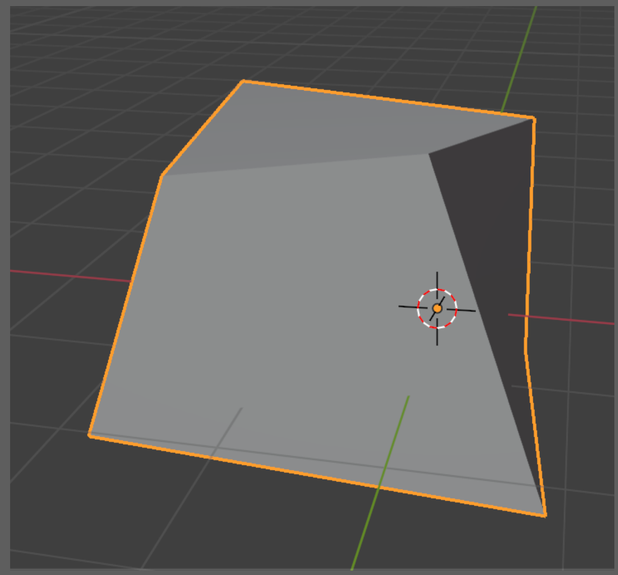


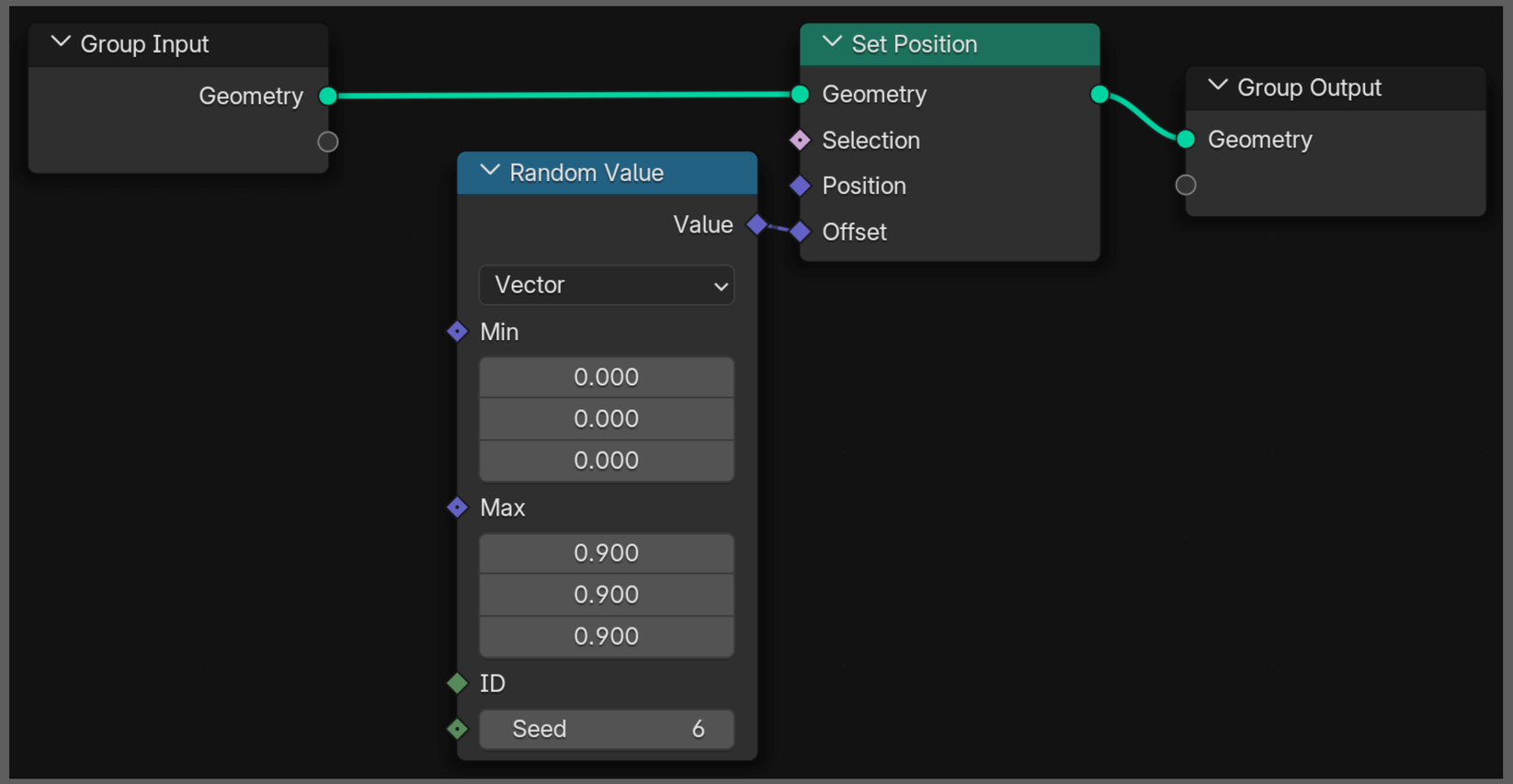
	position		
0	1.000	-1.000	-1.000
1	1.000	-1.000	1.000
2	1.000	1.000	-1.000
3	1.000	1.000	1.000
4	3.000	-1.000	-1.000
5	3.000	-1.000	1.000
6	3.000	1.000	-1.000
7	3.000	1.000	1.000

Values vs. Fields

Random Value Node

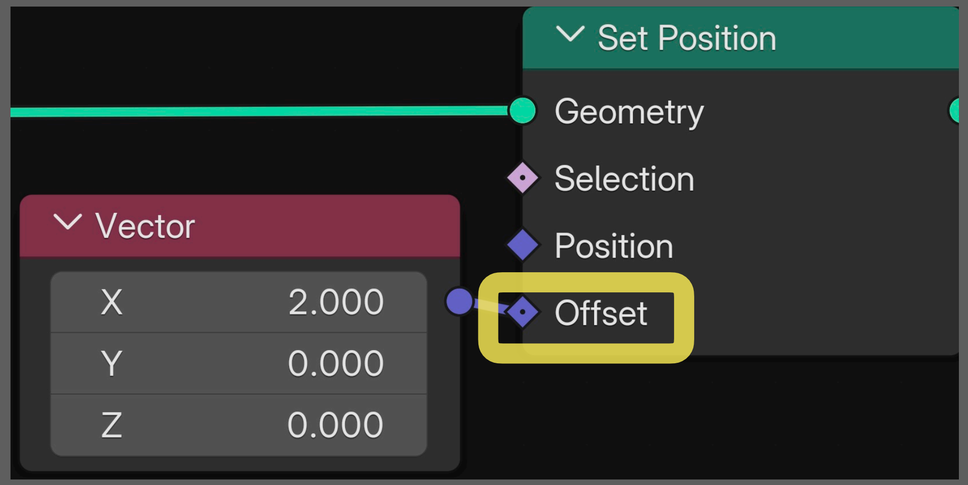


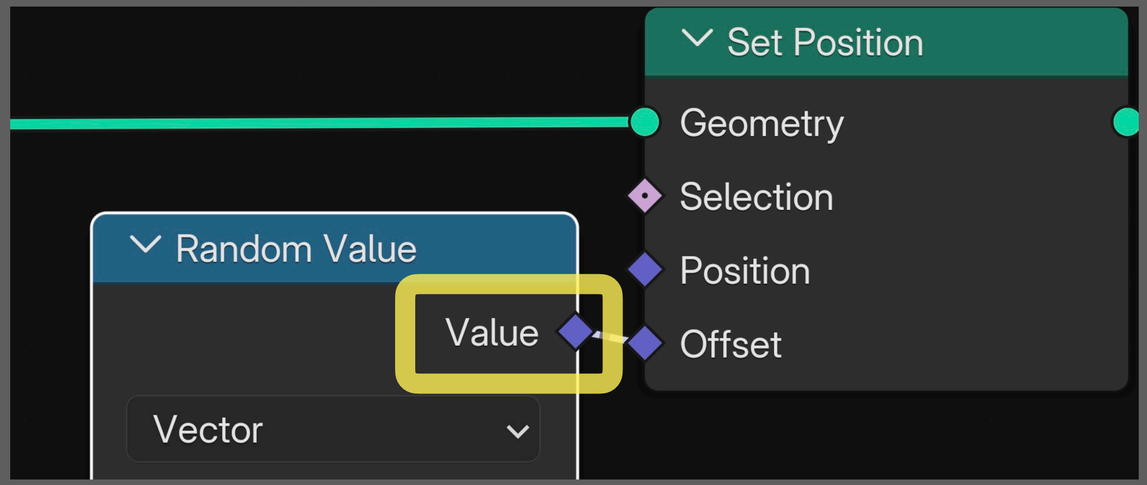


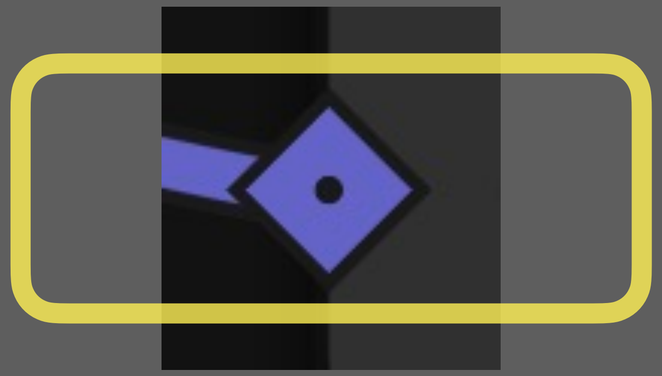


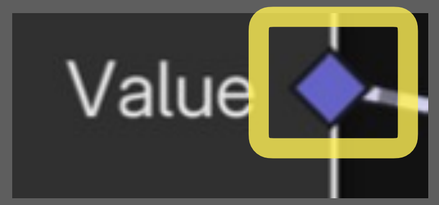
Values vs. Fields

Diamond with „Dot“
-> Indicator that all field elements have same value

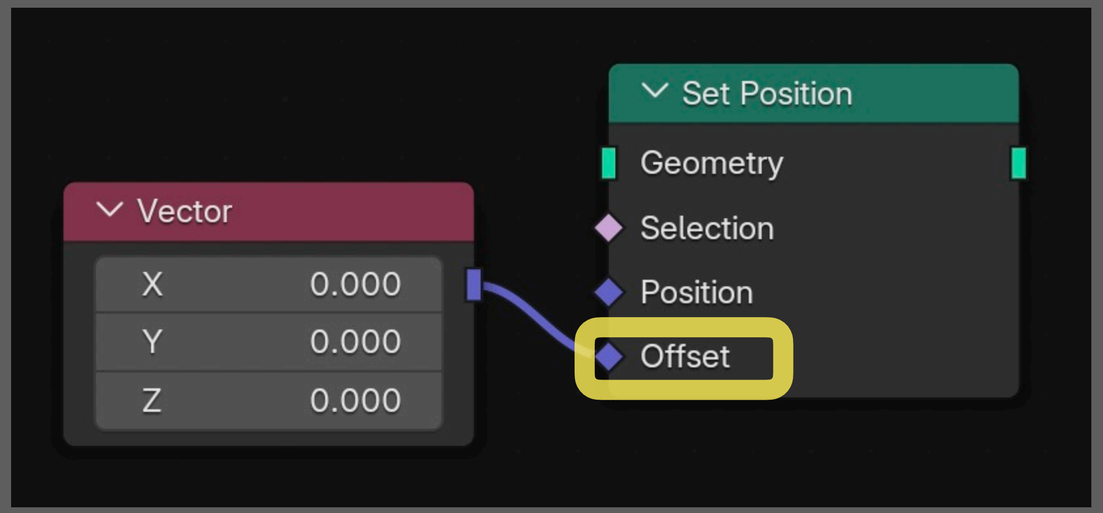


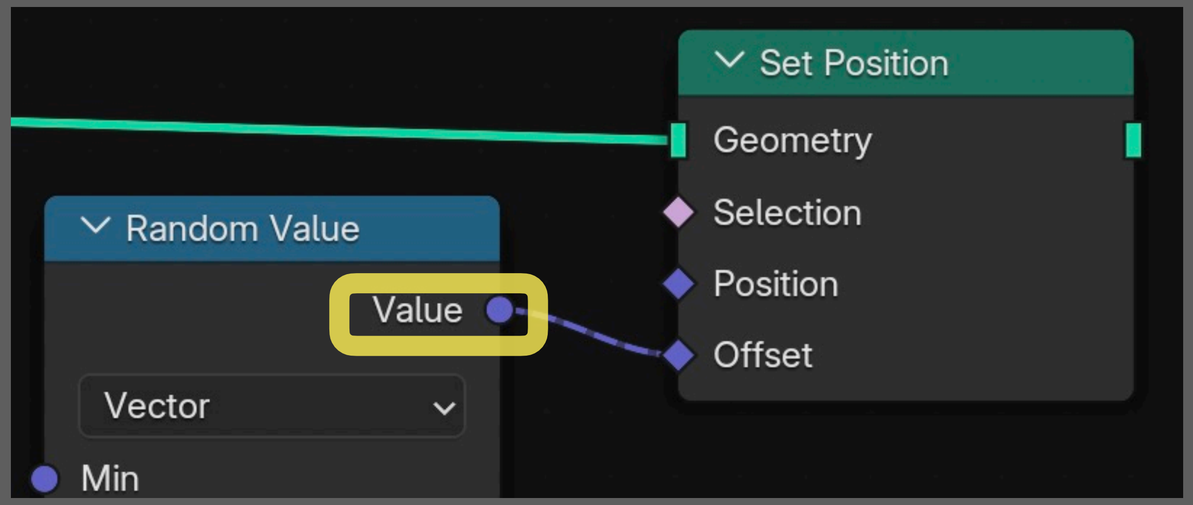


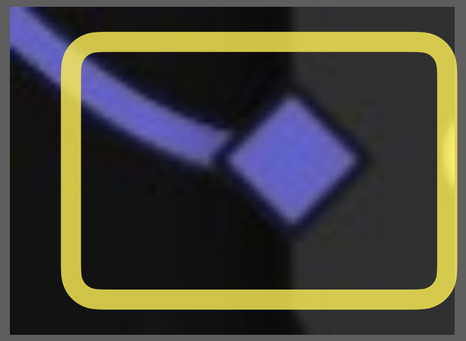


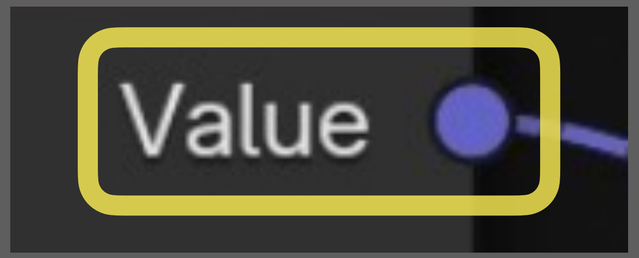


Blender 5.0


Set Position
Geometry
Selection
Position
Offset
Vector
X 0.000
Y 0.000
Z 0.000

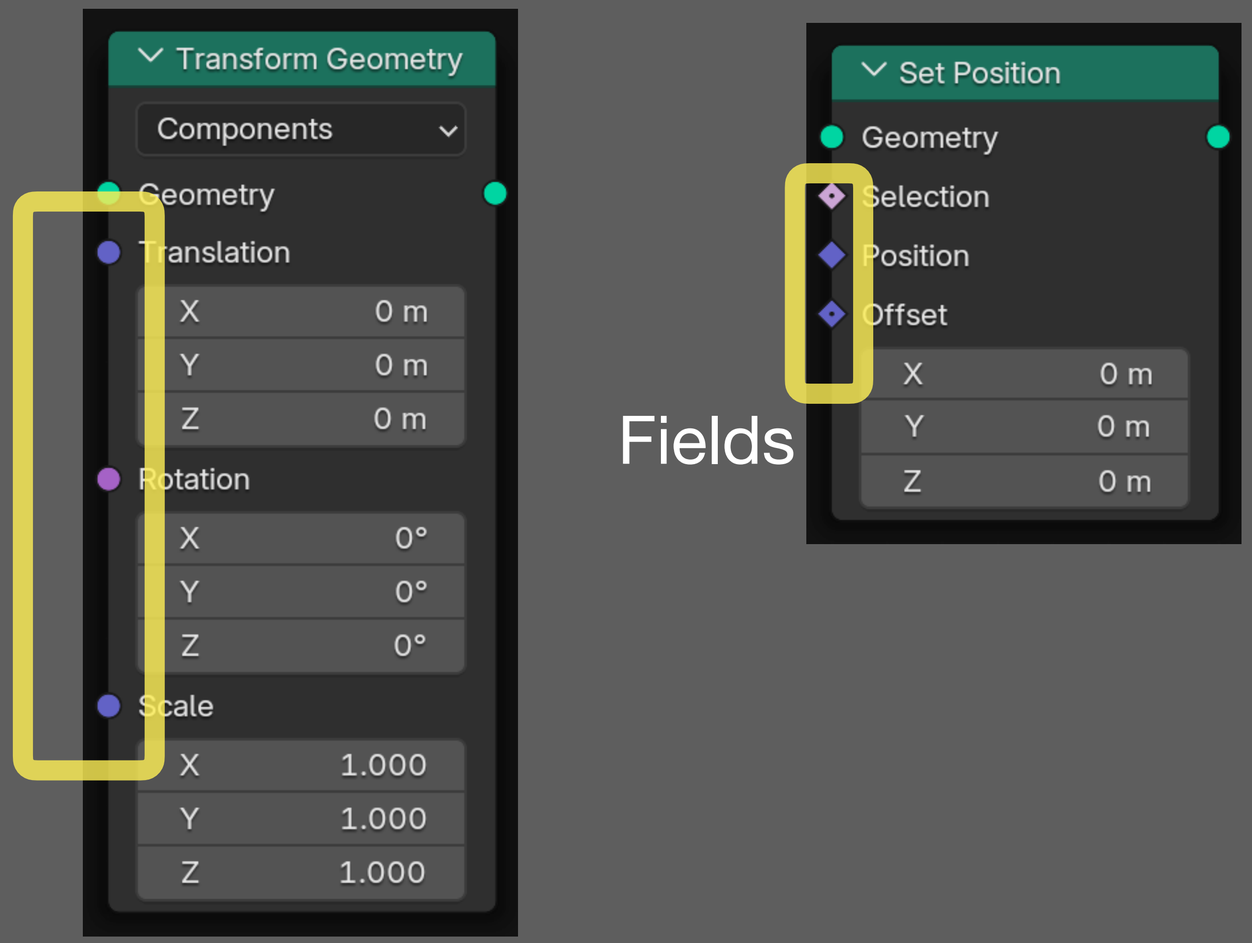

Set Position
Geometry
Selection
Position
Offset
Random Value
Value
Vector
Min




Value

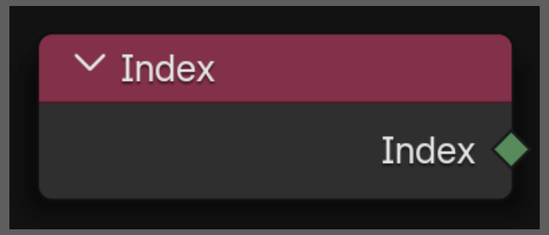
Values vs. Fields

Transform Geometry vs. Set Postion

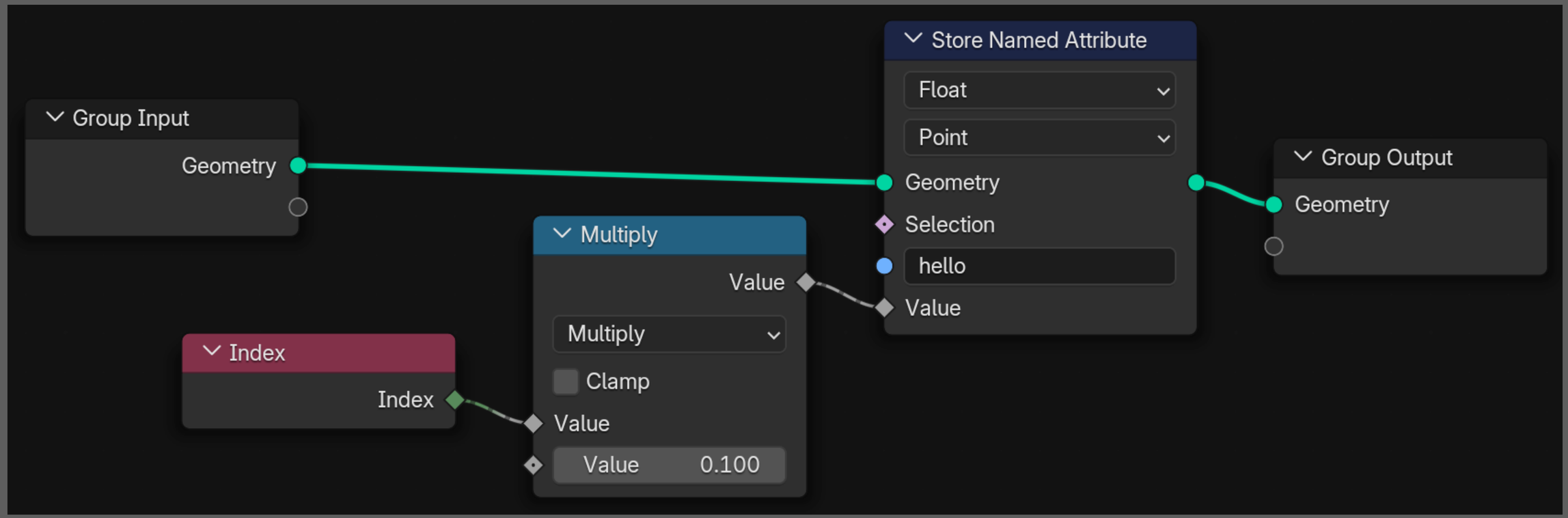


Values vs. Fields

Index Node



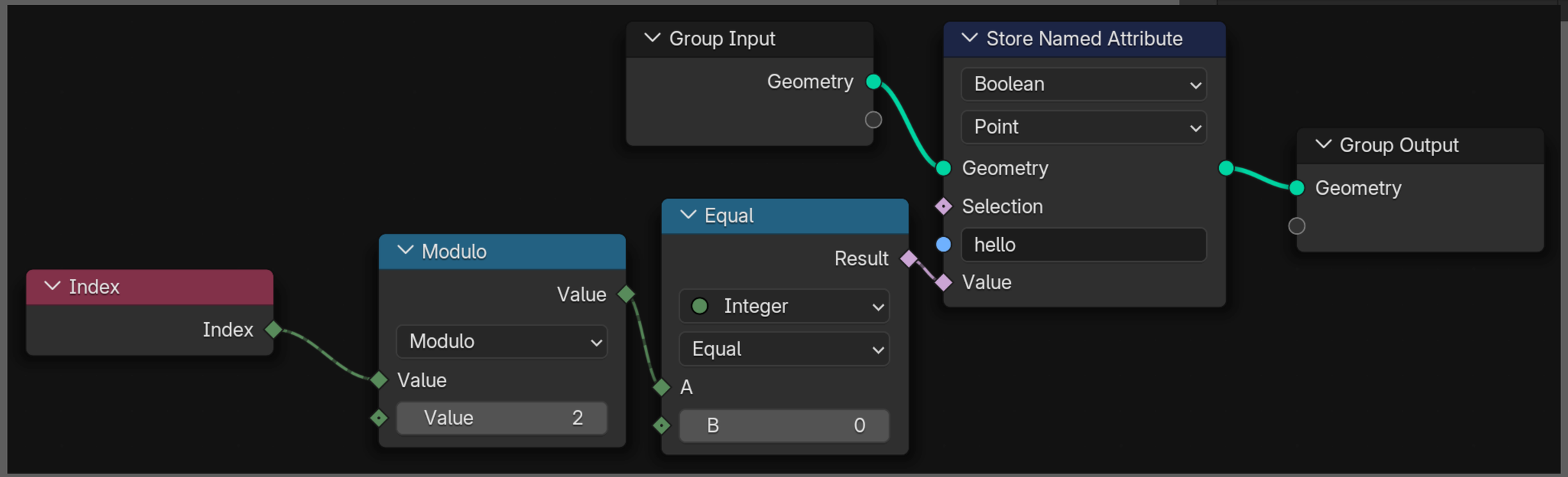
	position			hello
0	-1.000	-1.000	-1.000	0.000
1	-1.000	-1.000	1.000	0.100
2	-1.000	1.000	-1.000	0.200
3	-1.000	1.000	1.000	0.300
4	1.000	-1.000	-1.000	0.400
5	1.000	-1.000	1.000	0.500
6	1.000	1.000	-1.000	0.600
7	1.000	1.000	1.000	0.700



Values vs. Fields

Index Node

	position			hello
0	-1.000	-1.000	-1.000	☑
1	-1.000	-1.000	1.000	☐
2	-1.000	1.000	-1.000	☑
3	-1.000	1.000	1.000	☐
4	1.000	-1.000	-1.000	☑
5	1.000	-1.000	1.000	☐
6	1.000	1.000	-1.000	☑
7	1.000	1.000	1.000	☐



Values vs. Fields

Task: Create this Spreadsheet

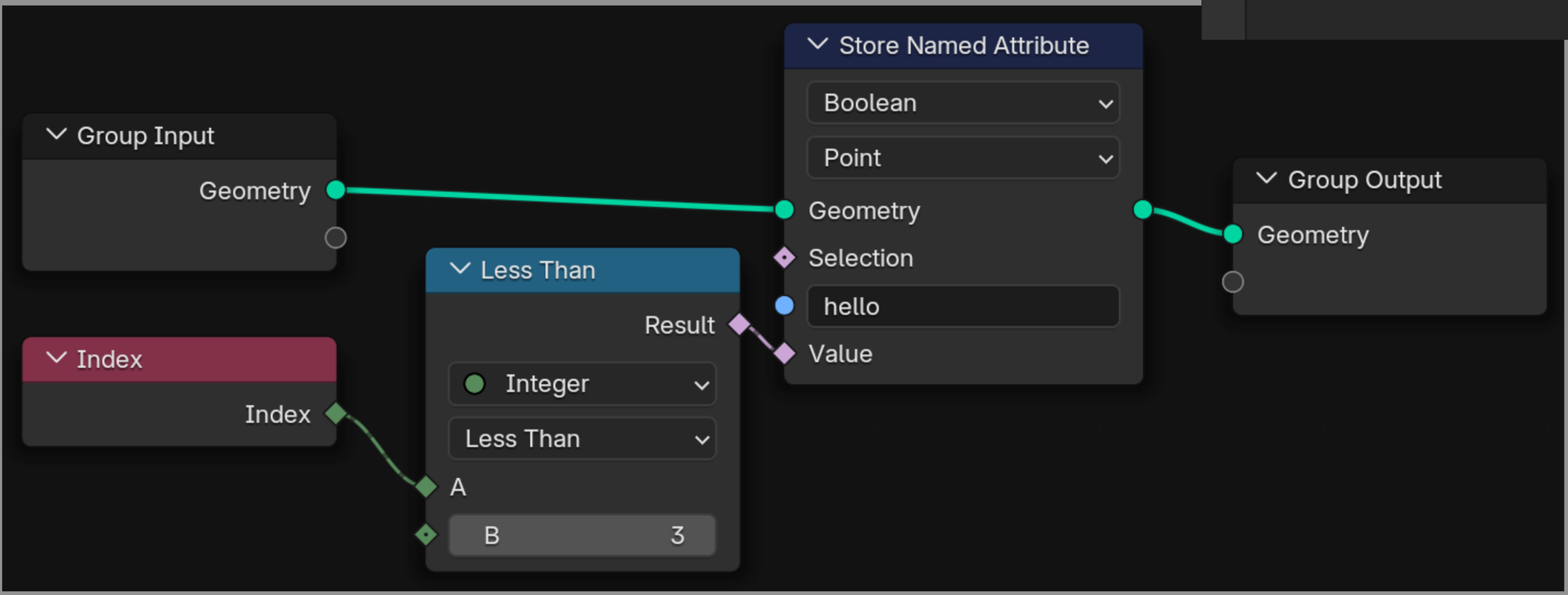
	position			hello
0	-1.000	-1.000	-1.000	☑
1	-1.000	-1.000	1.000	☑
2	-1.000	1.000	-1.000	☑
3	-1.000	1.000	1.000	☐
4	1.000	-1.000	-1.000	☐
5	1.000	-1.000	1.000	☐
6	1.000	1.000	-1.000	☐
7	1.000	1.000	1.000	☐

Use these nodes:

- Read Index
- Store Named Attribute
- Math Compare

Values vs. Fields Solution

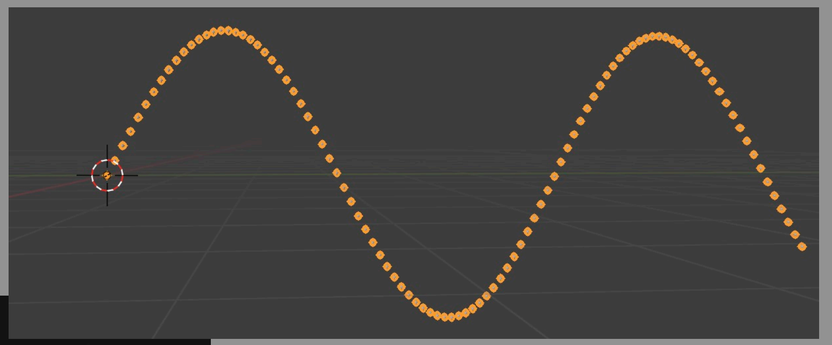
	position			hello
0	-1.000	-1.000	-1.000	☑
1	-1.000	-1.000	1.000	☑
2	-1.000	1.000	-1.000	☑
3	-1.000	1.000	1.000	☐
4	1.000	-1.000	-1.000	☐
5	1.000	-1.000	1.000	☐
6	1.000	1.000	-1.000	☐
7	1.000	1.000	1.000	☐

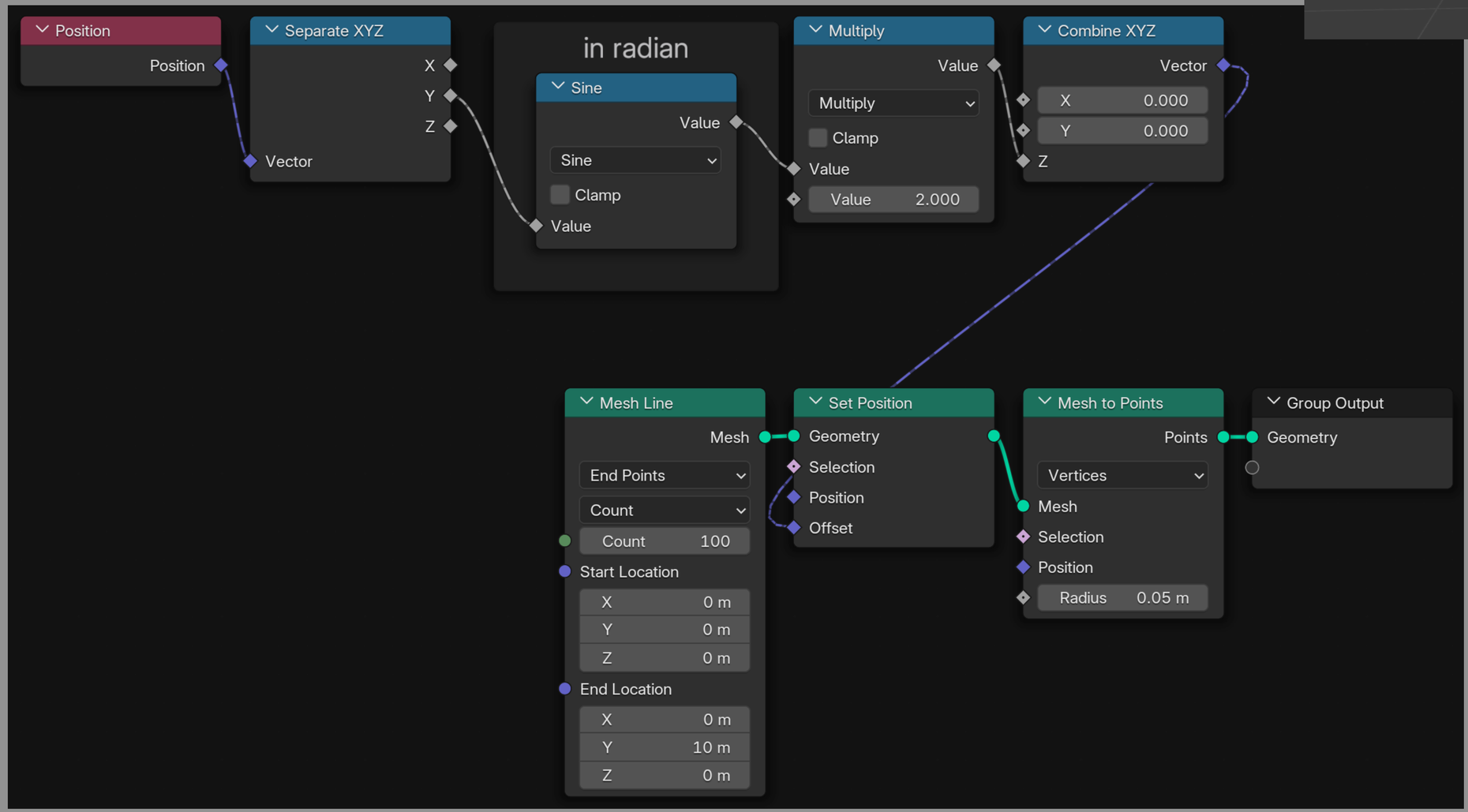


Procedural Shapes

Procedural Shapes

Task: Create this sine curve

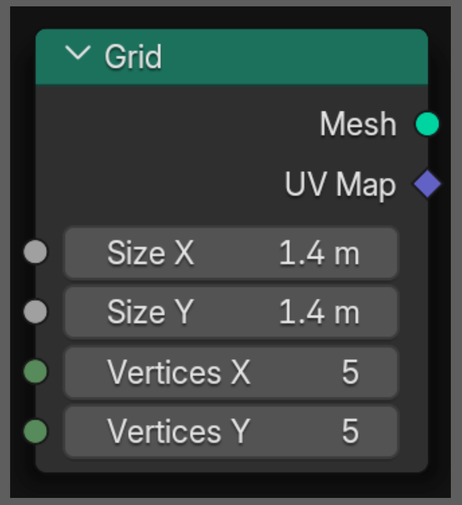


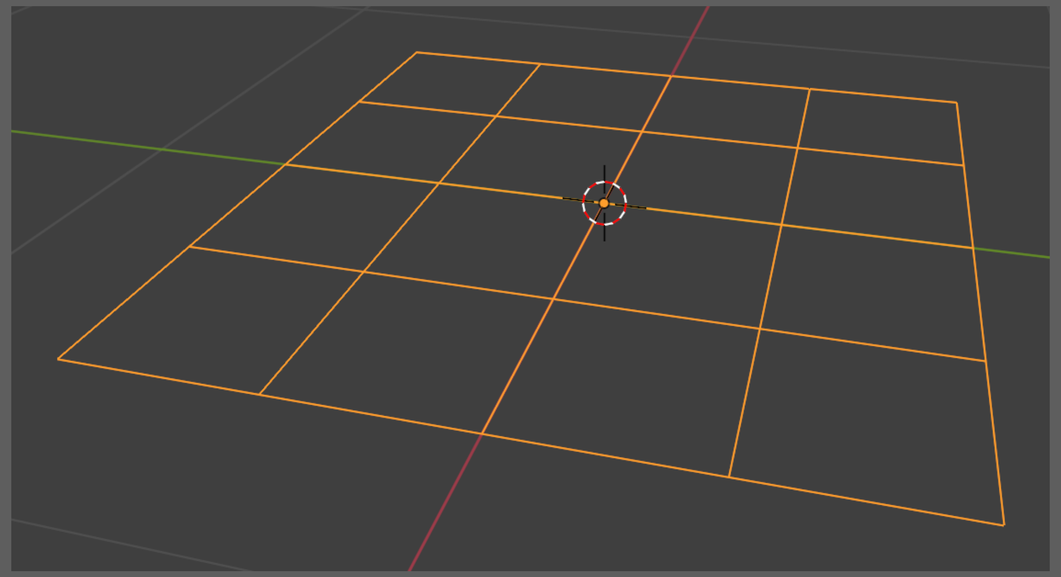


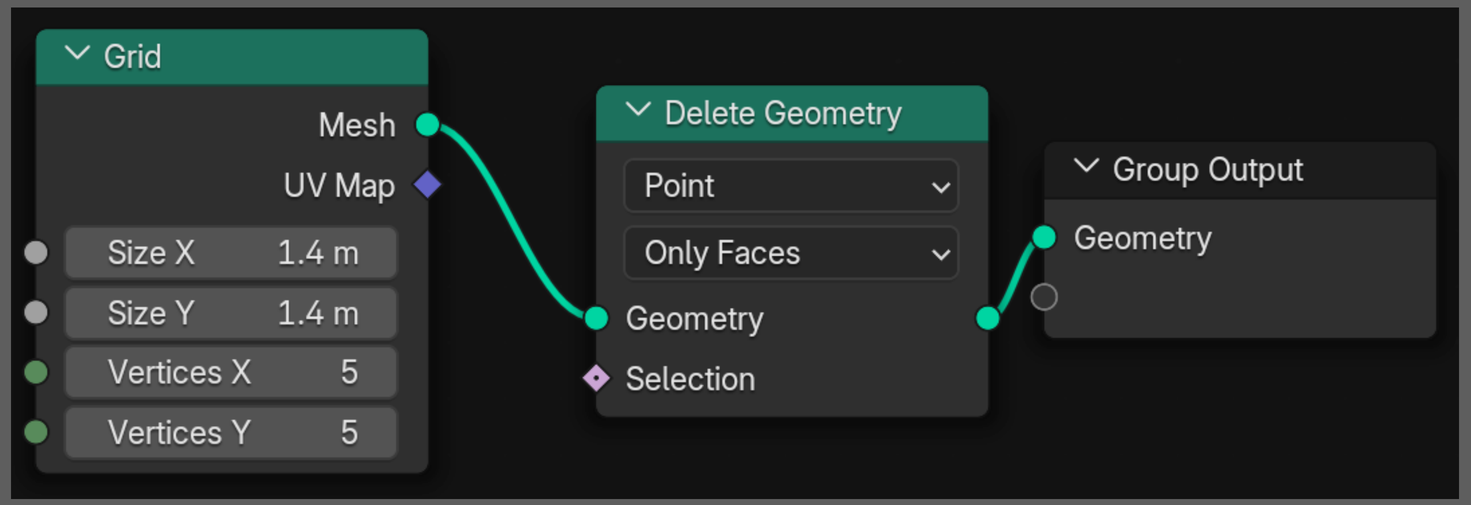
$$z(x,t) = A\sin(kx - \omega t)$$

Procedural Shapes

Grid

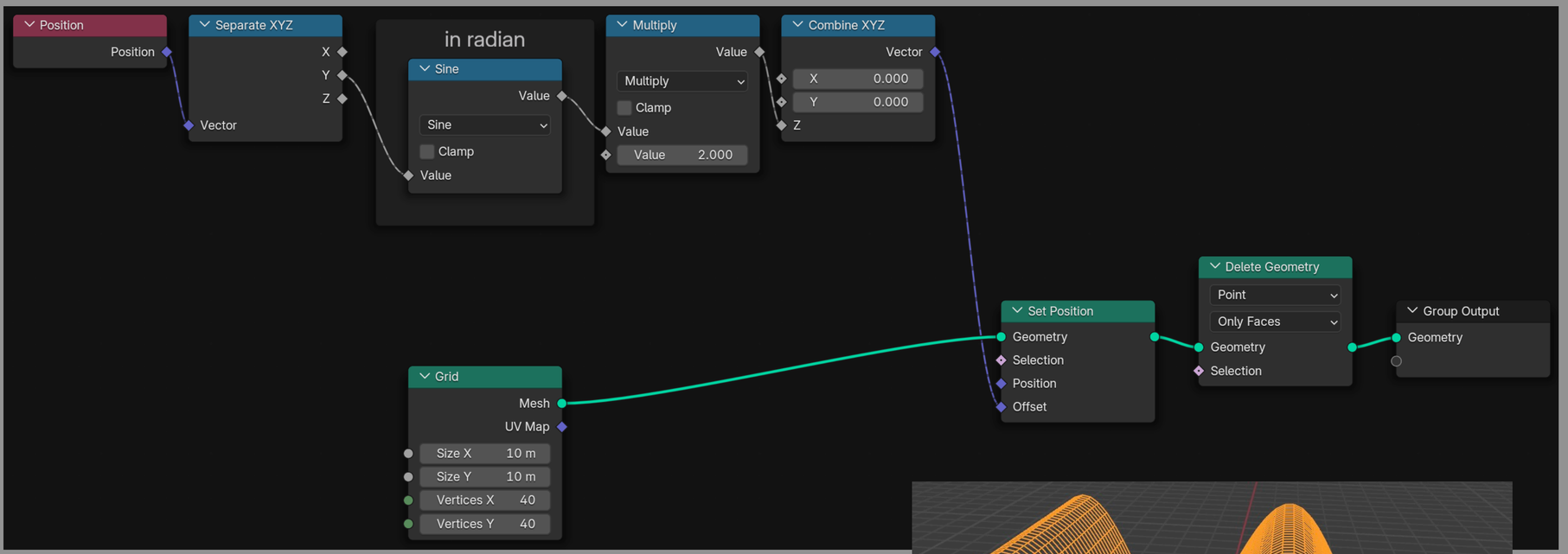




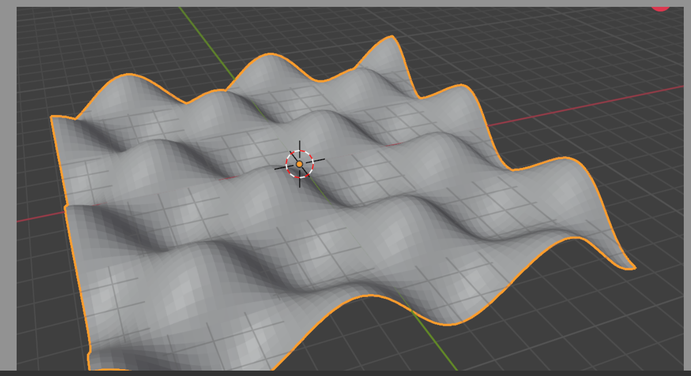


Procedural Shapes

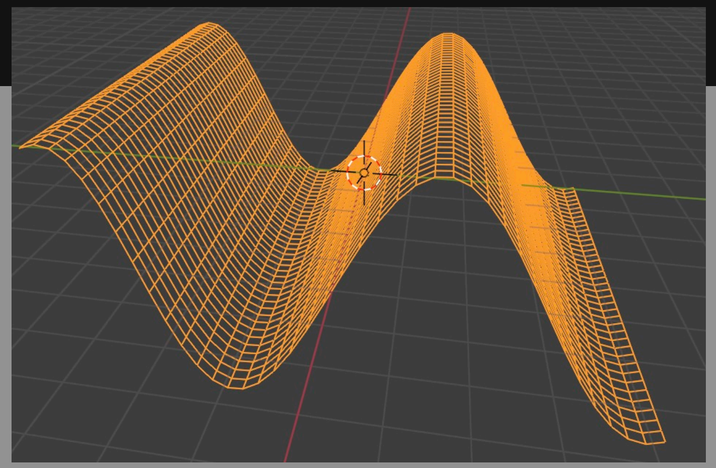
Task: Create this 2D sine curve



Goal:



$$z(x, y, t) = \sin(k_x x + \omega t) \cdot \sin(k_y y + \omega t)$$

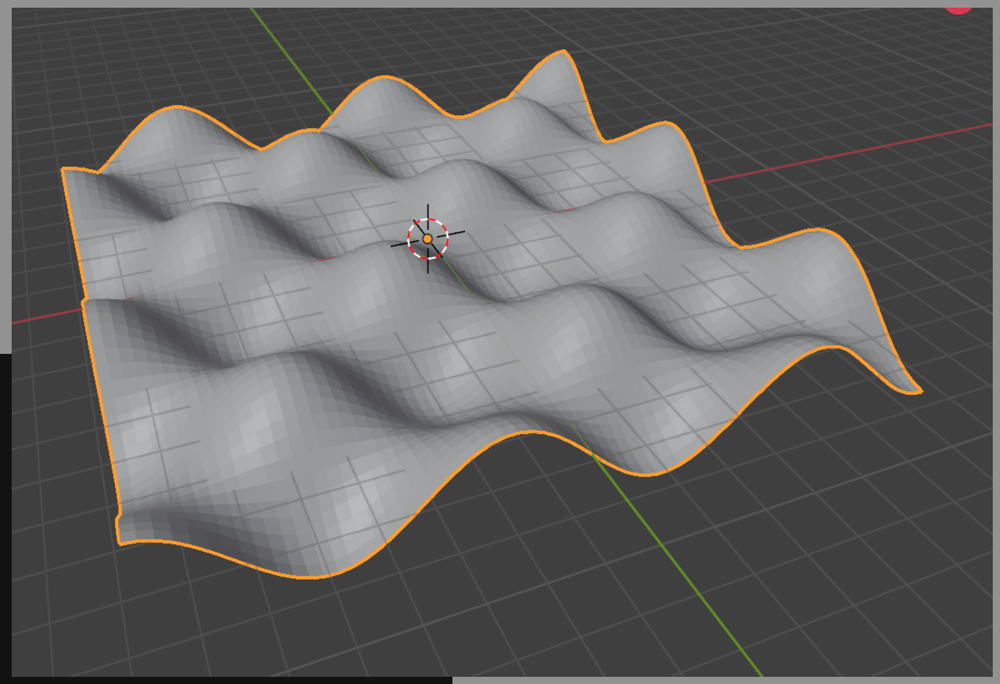


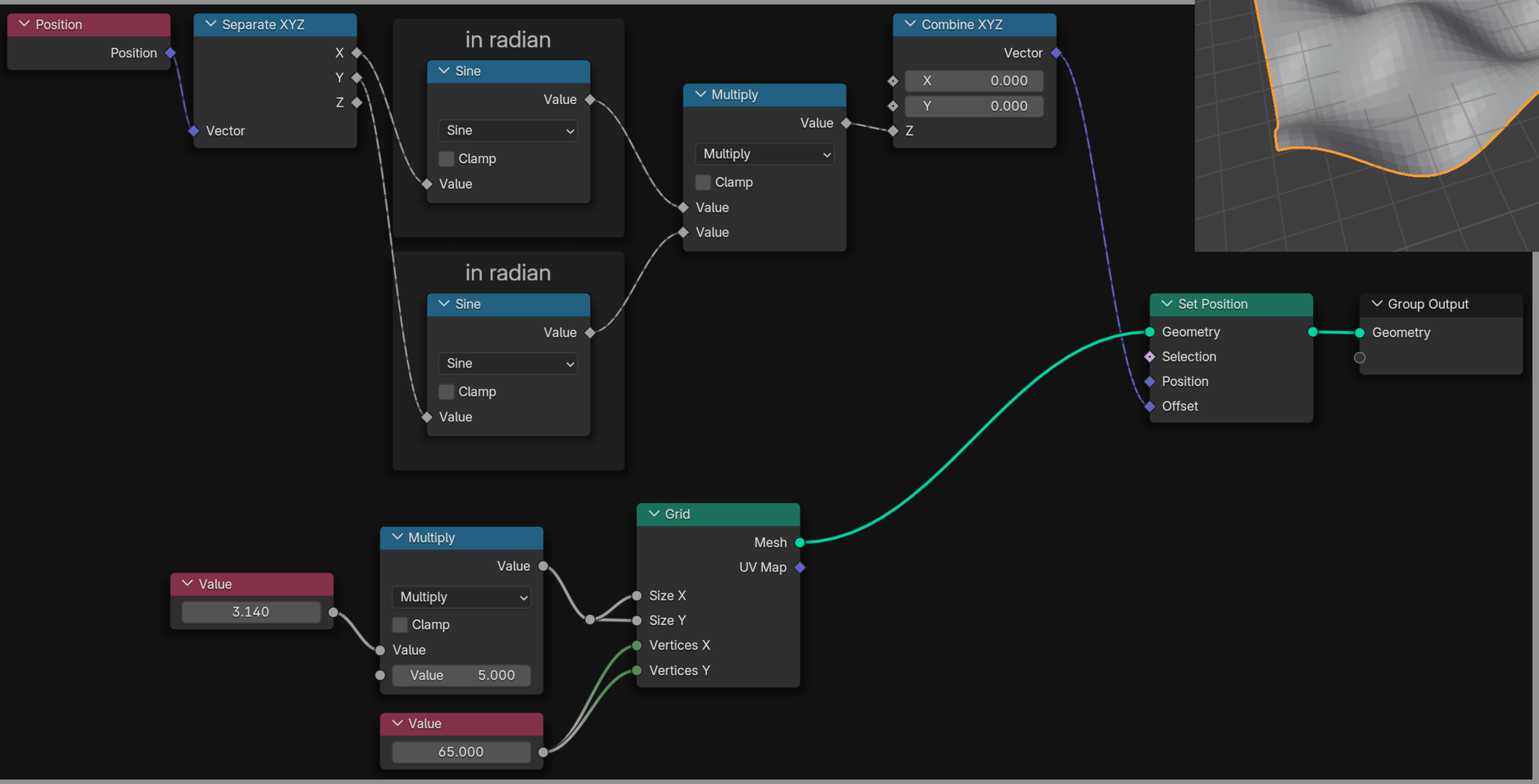
Use these nodes:

- Grid Node
- Use the above node setup as a starting point

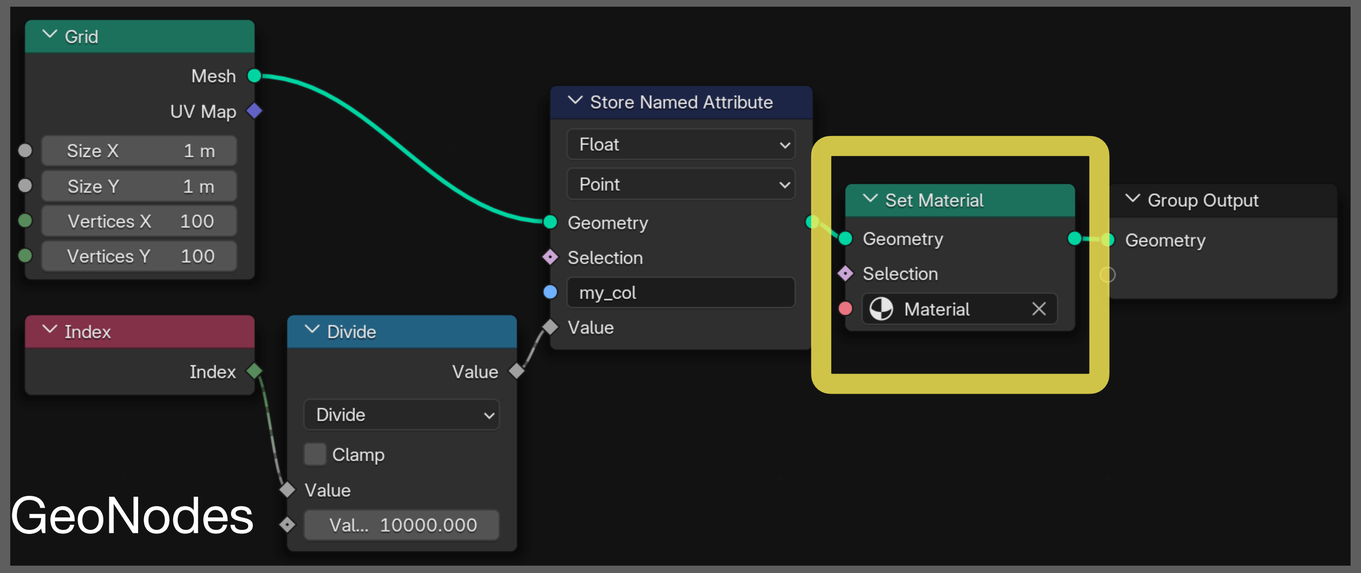
Procedural Shapes

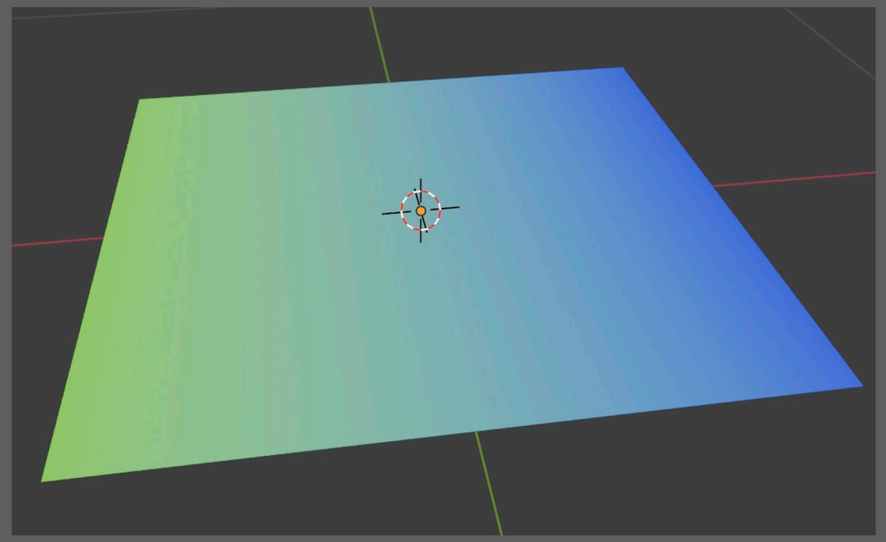
Solution

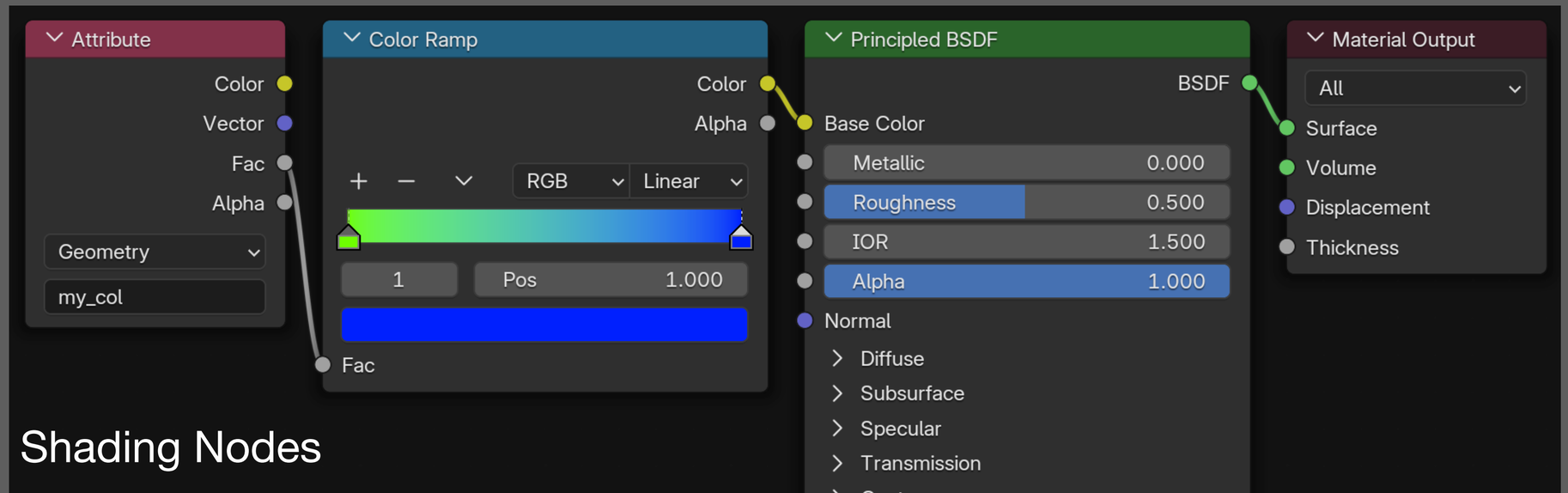




Procedural Shapes + Colors

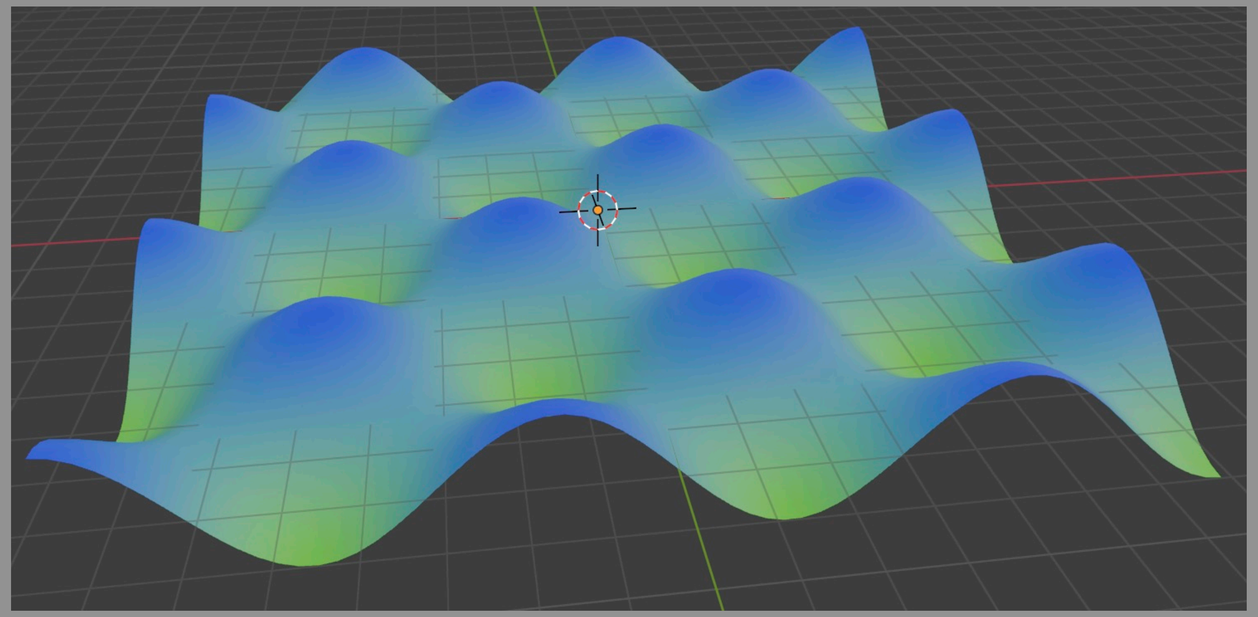






Procedural Shapes

Task: Add color to 2D sine

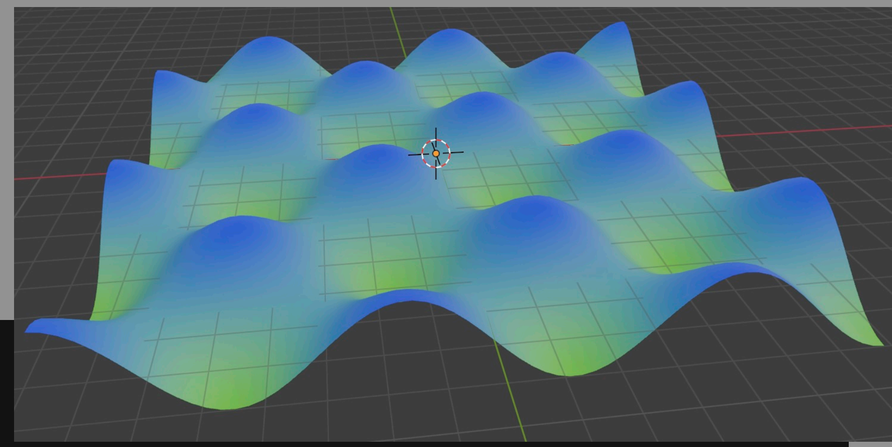


Use these nodes:

- Store Named Attribute
- Set Material

Procedural Shapes

Solution



Position
Position
Separate XYZ
X
Y
Z
Vector
in radian
Sine
Value
Sine
Clamp
Value
in radian
Sine
Value
Sine
Clamp
Value
Multiply
Value
Multiply
Clamp
Value
Value
Add
Value
Add
Clamp
Value
Value 1.000
Divide
Value
Divide
Clamp
Value
Value 2.000
Combine XYZ
Vector
X 0.000
Y 0.000
Z
Set Position
Geometry
Selection
Position
Offset
Store Named Attri...
Float
Point
Geometry
Selection
my_col
Value
Set Material
Geometry
Selection
SineMat
Set Shade Smooth
Edge
Face
Geometry
Selection
Shade Smooth
Group Output
Geometry
Grid
Mesh
UV Map
Size X
Size Y
Vertices X
Vertices Y
Multiply
Value
Multiply
Clamp
Value
Value 5.000
Value
3.140
Value
65.000

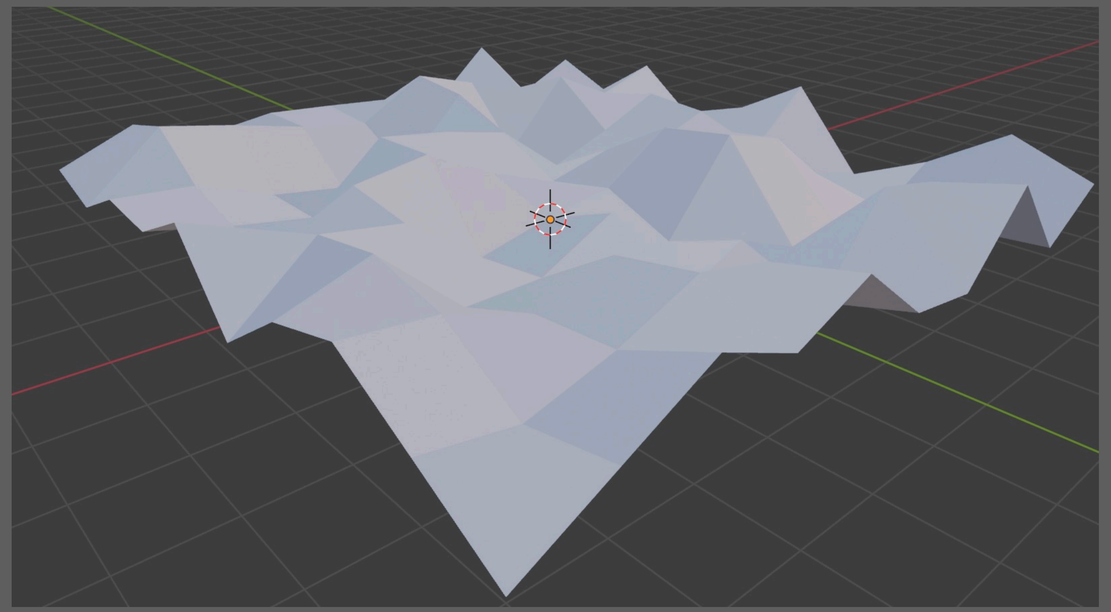
Attribute
Color
Vector
Fac
Alpha
Geometry
my_col
Color Ramp
Color
Alpha
RGB
Linear
1
Pos 1.000
Fac
Principled BSDF
BSDF
Base Color
Metallic 0.000
Roughness 0.500
IOR 1.500
Alpha 1.000
Normal
Diffuse
Subsurface
Specular
Transmission
Material Output
All
Surface
Volume
Displacement
Thickness

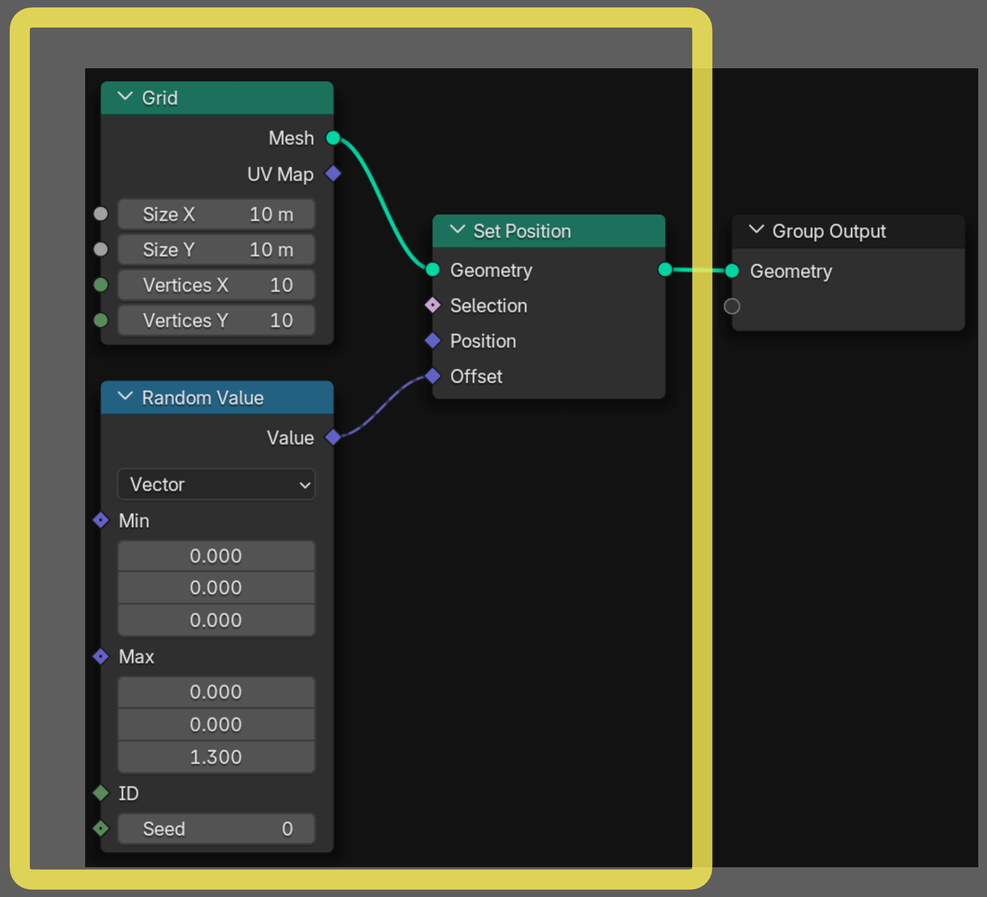
Shading Nodes

Procedural Shapes

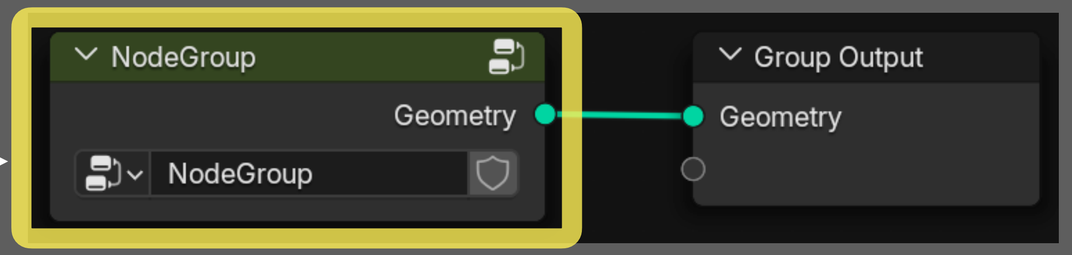
Node Group

- Right click -> „Make Group“
- Press Tab: enter or exit group



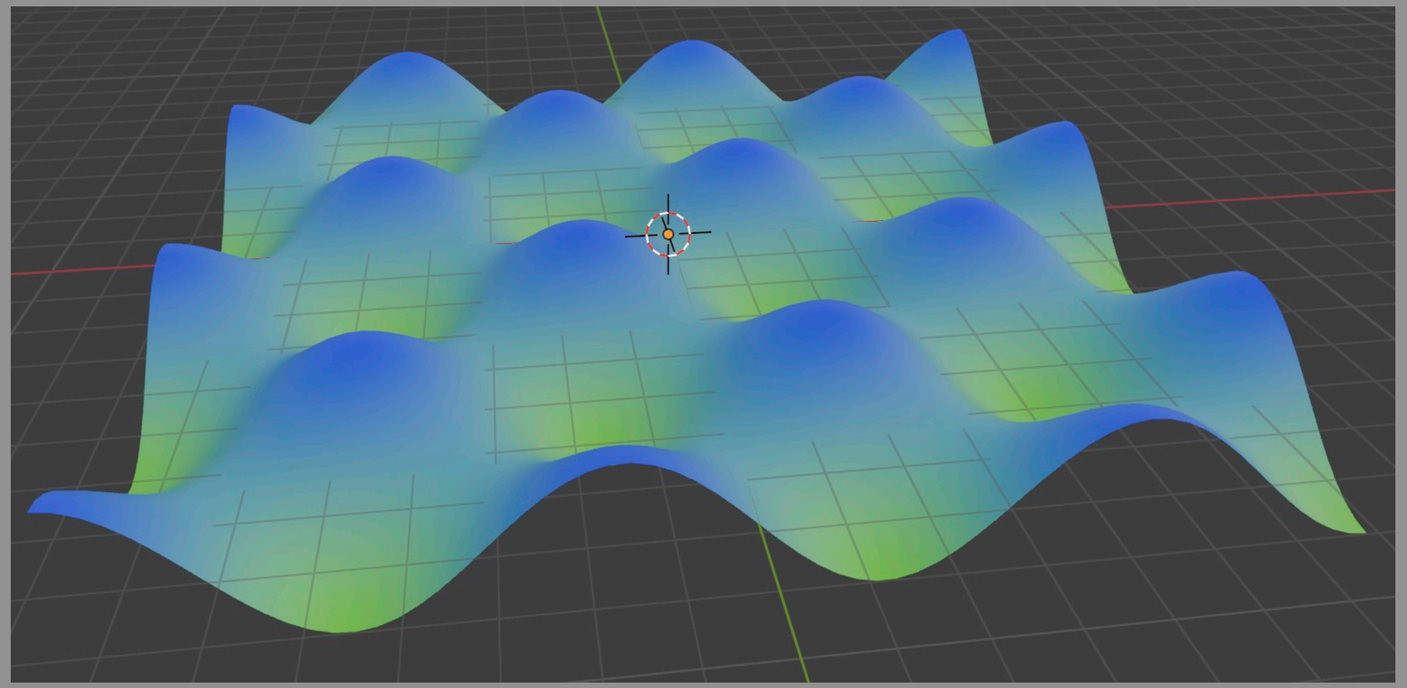


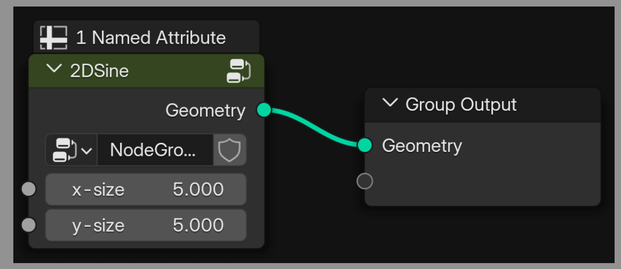
becomes



Procedural Shapes

Task: Make a „Sine“ node group

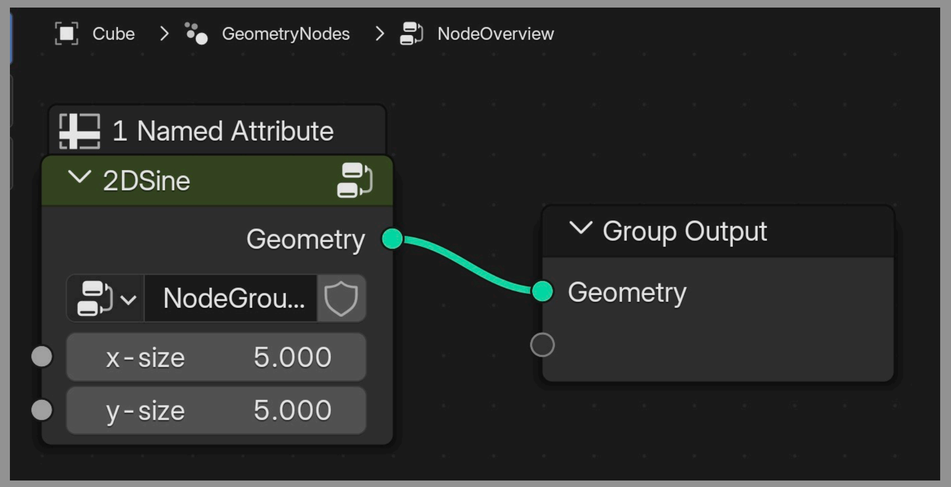


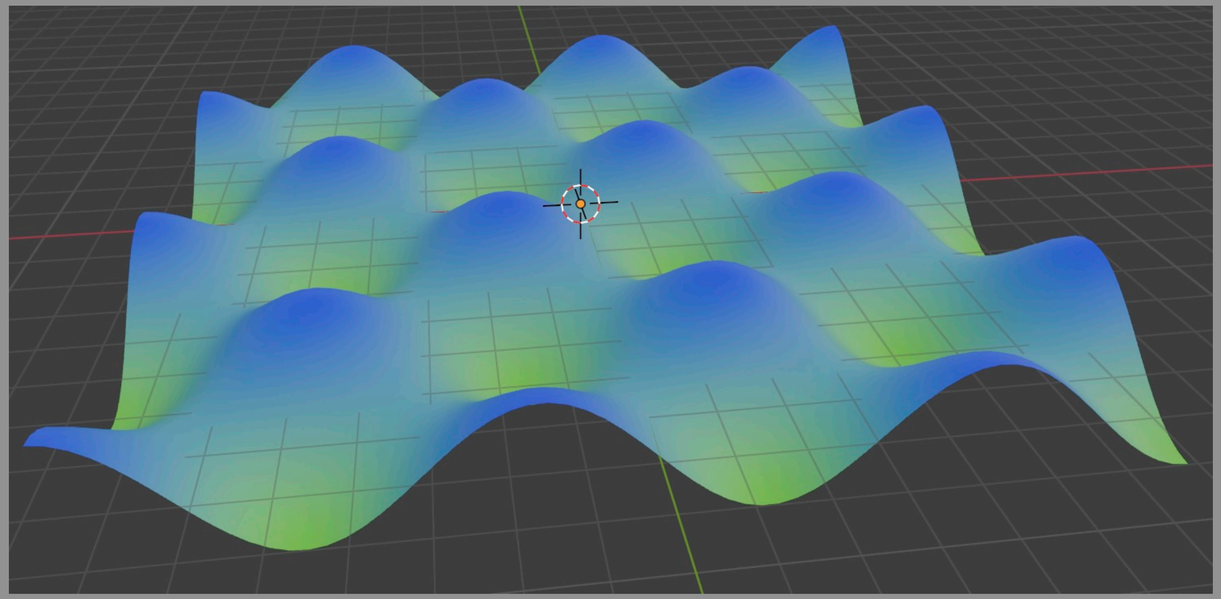


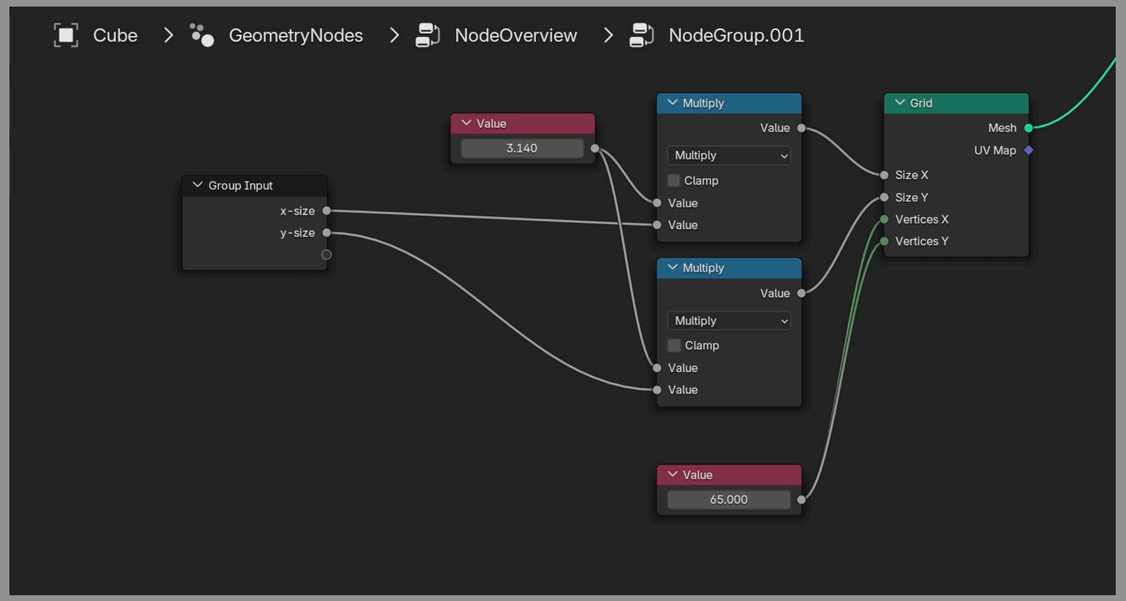
- Select all nodes for the group
- Right click -> „Make Group“
- Press Tab: enter or exit group
- Connect noodles to „Group Input“ for size x and size y

Procedural Shapes

Solution

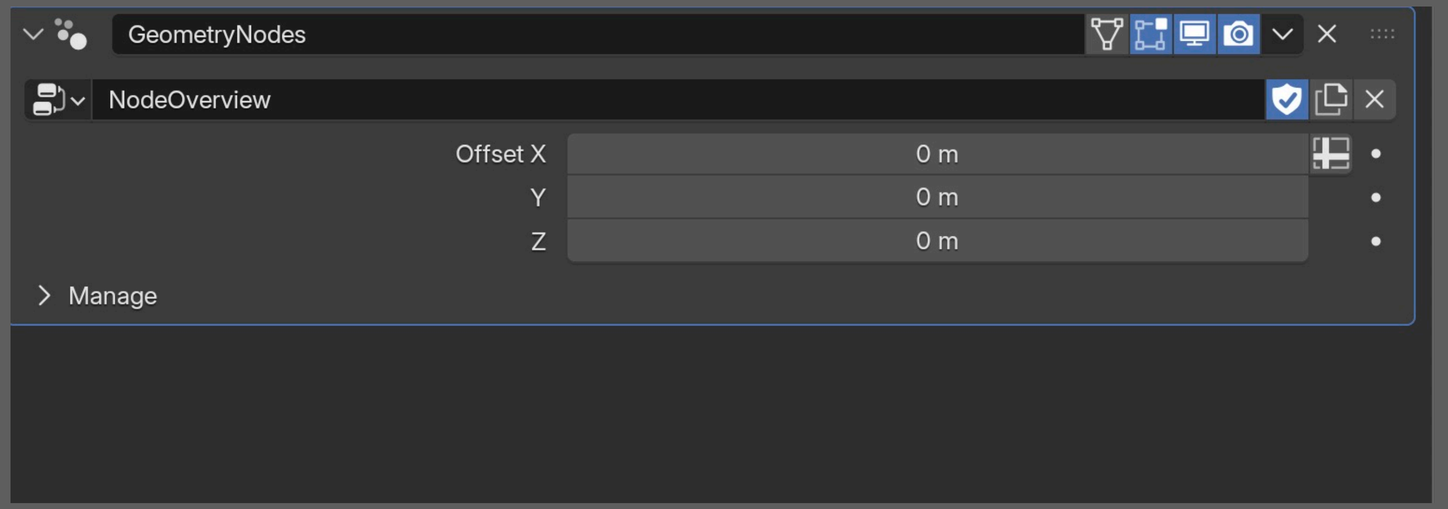






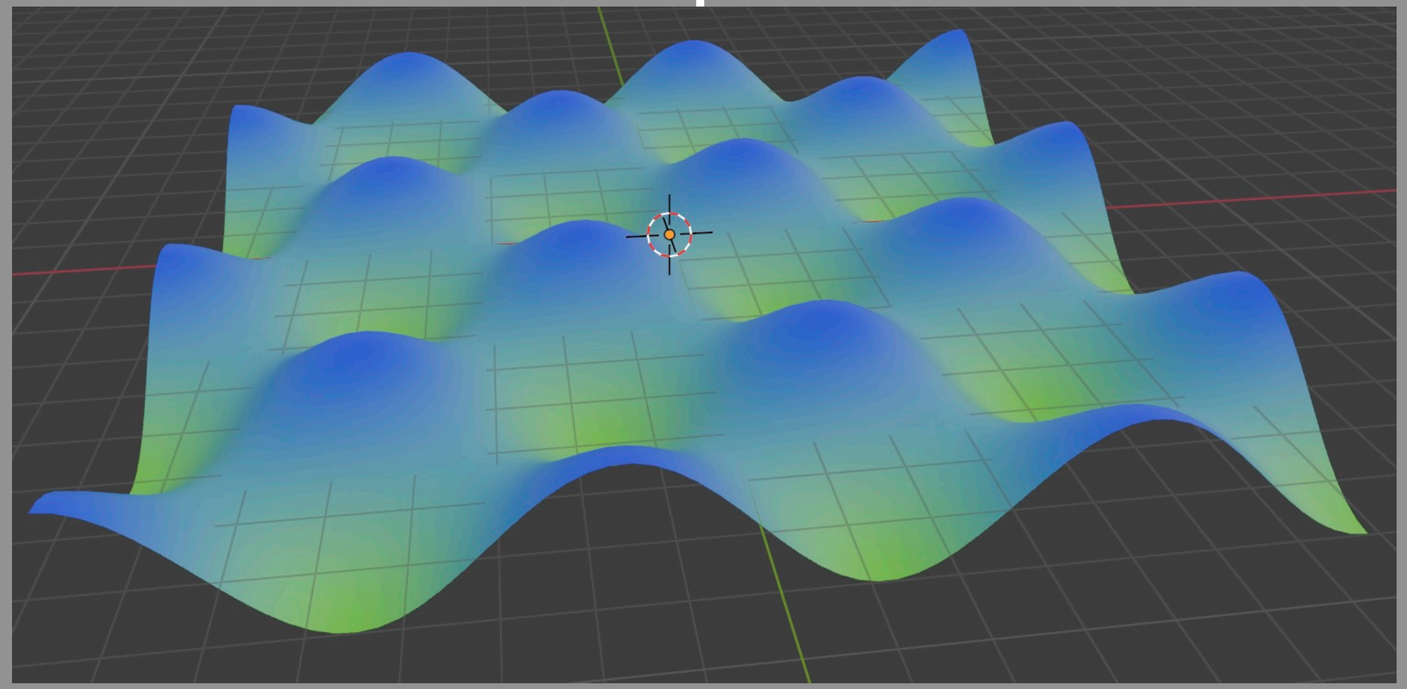
Procedural Shapes

Modifier input

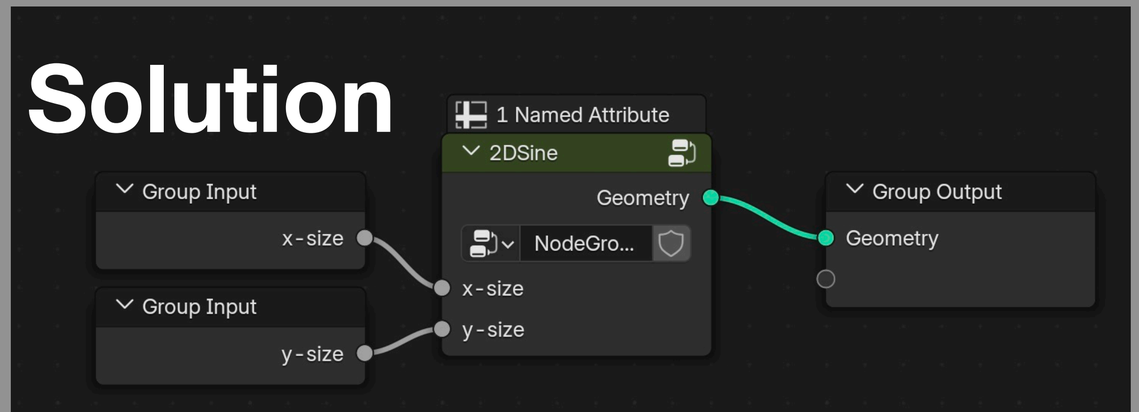


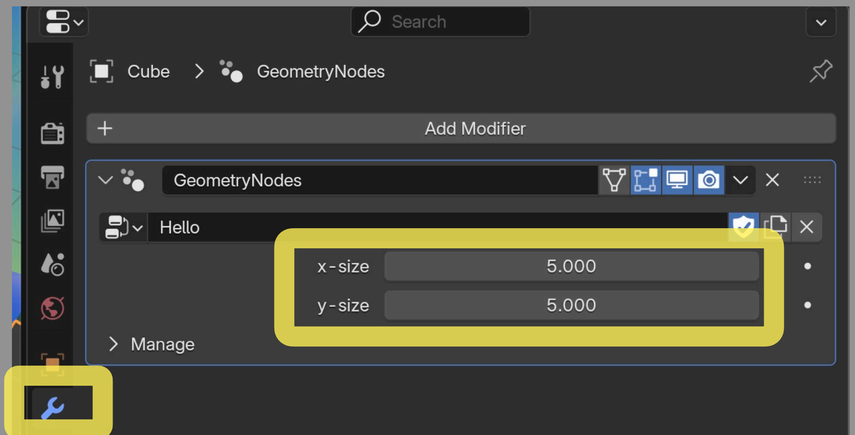
Procedural Shapes

Task: Modifier input for 2D sine



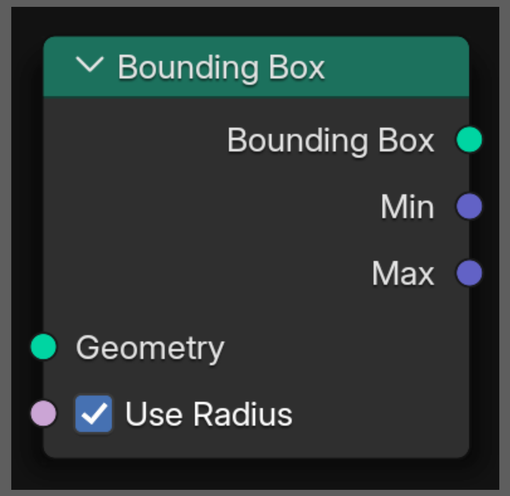
Solution

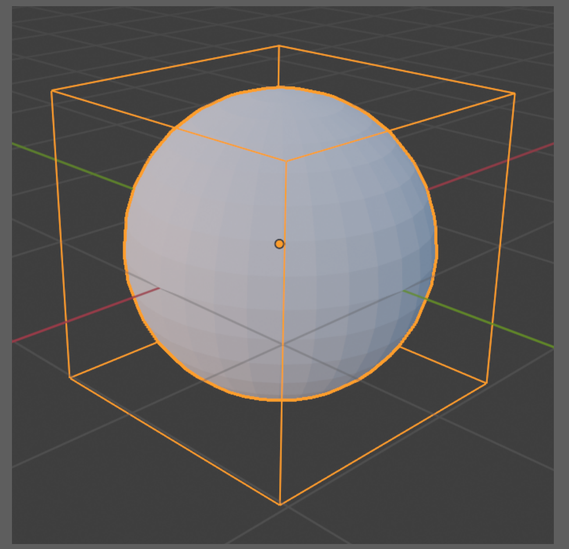


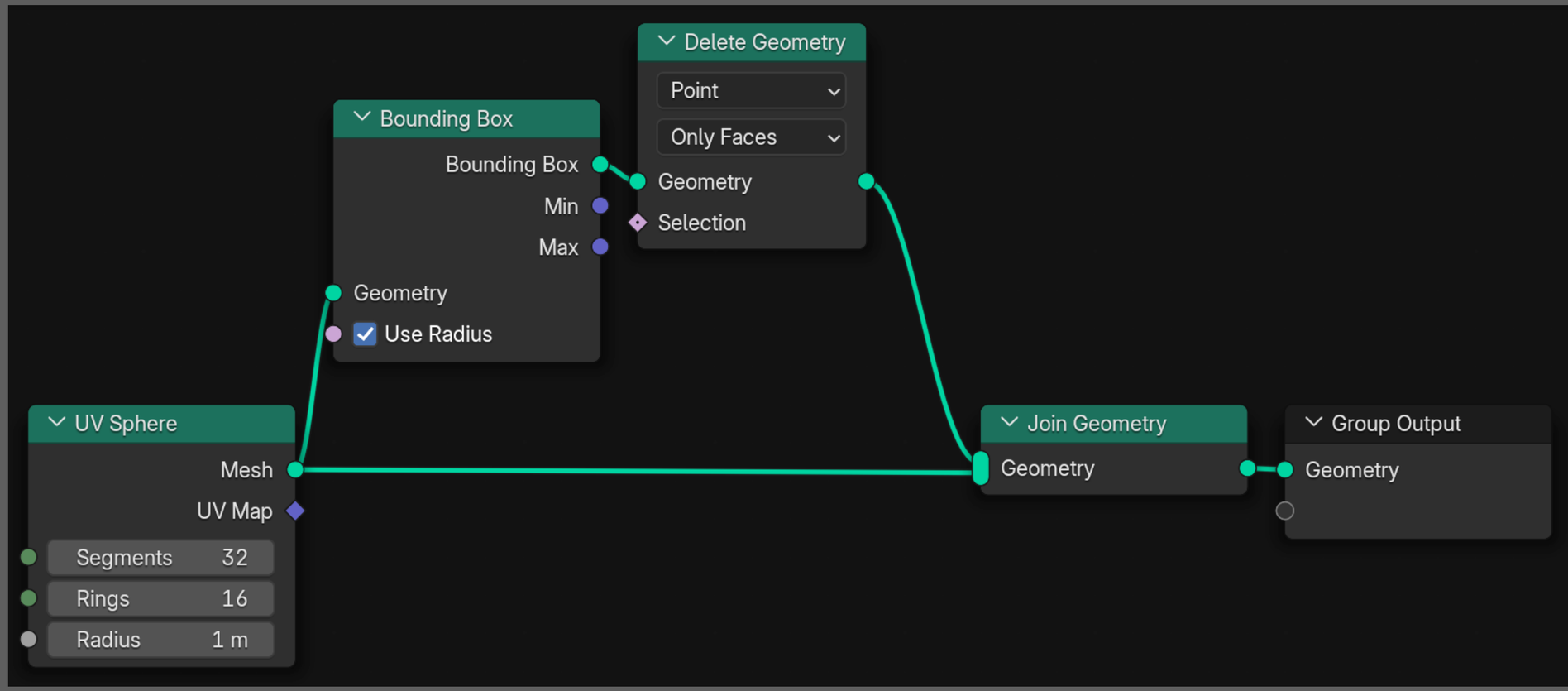


Procedural Shapes

Bounding Box



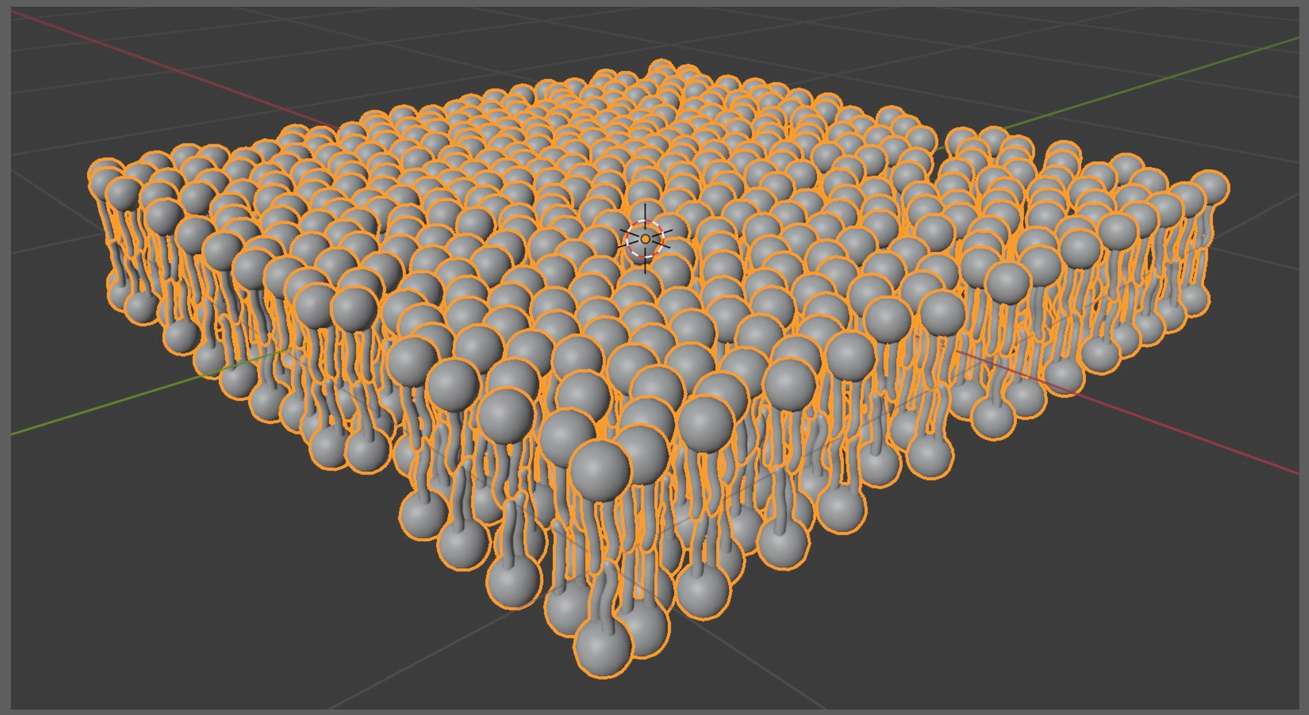


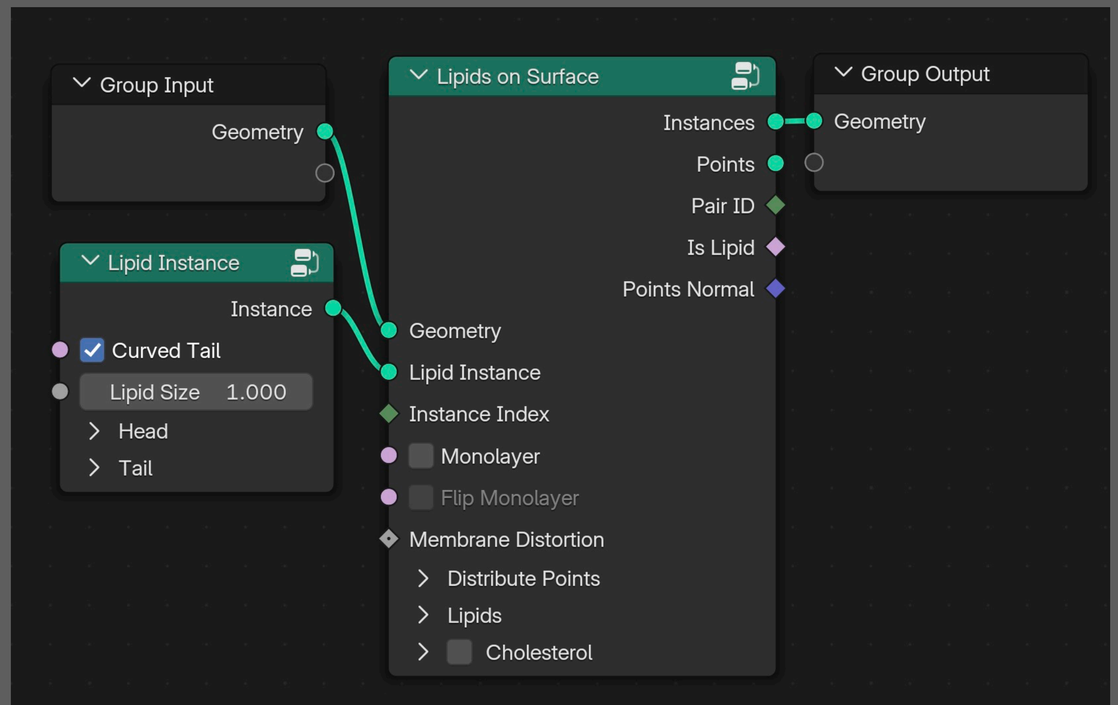


Procedural Shapes

Membrane

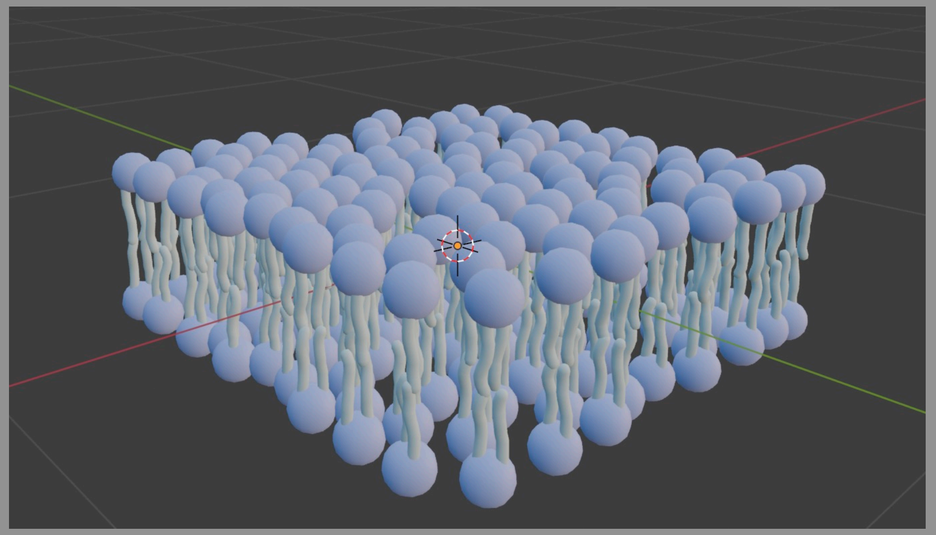
https://julioarvellos.gumroad.com/l/wzsgu



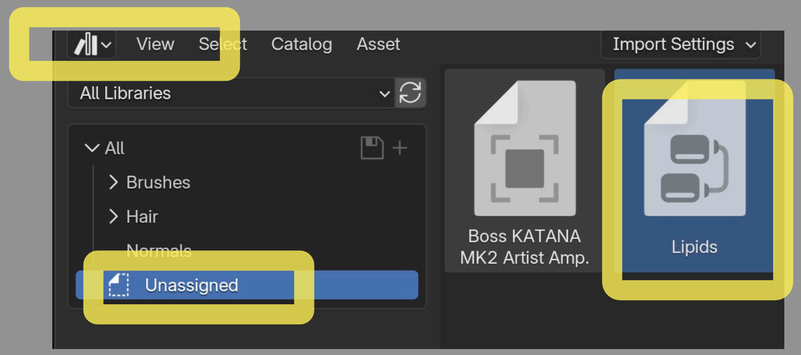


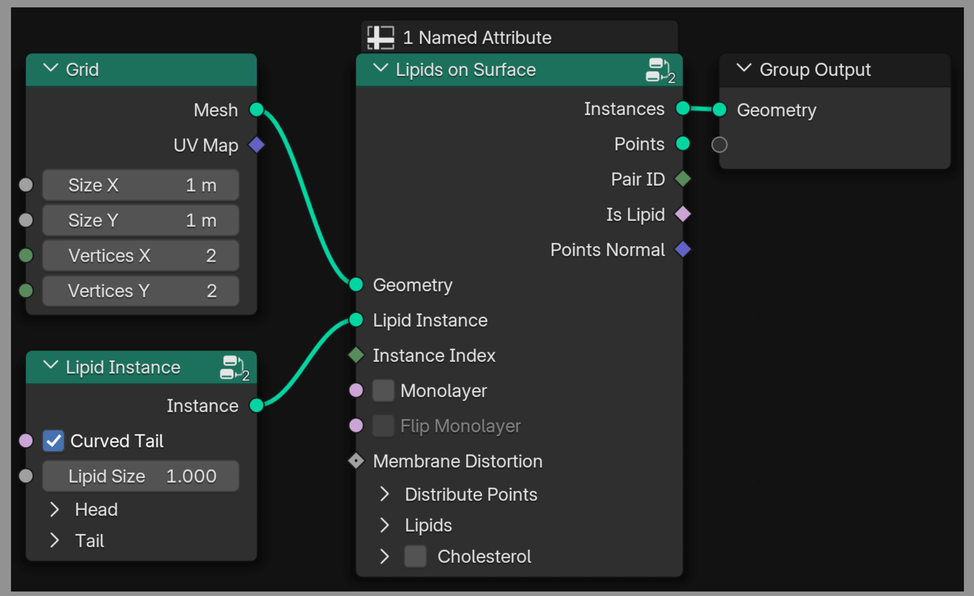
Procedural Shapes

Task: Create a simple membrane



Solution

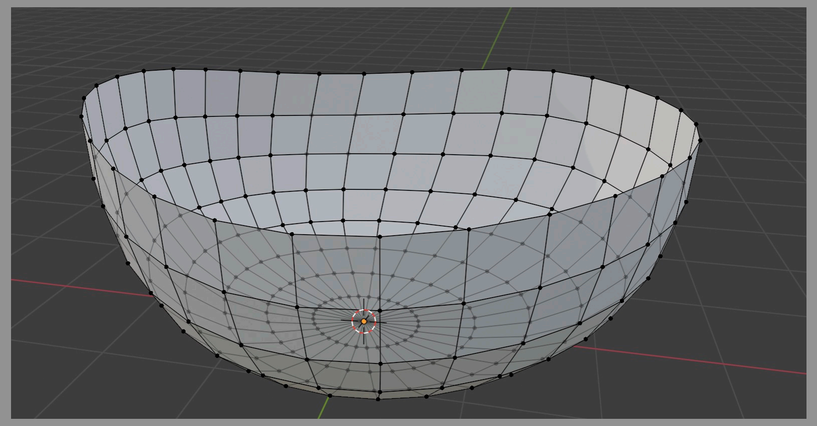


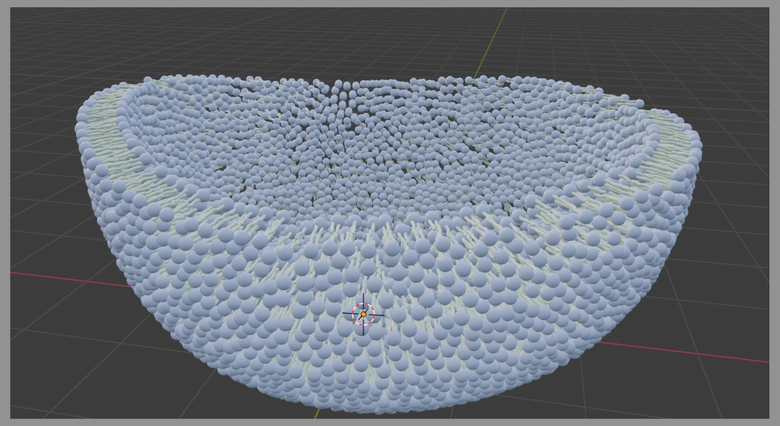


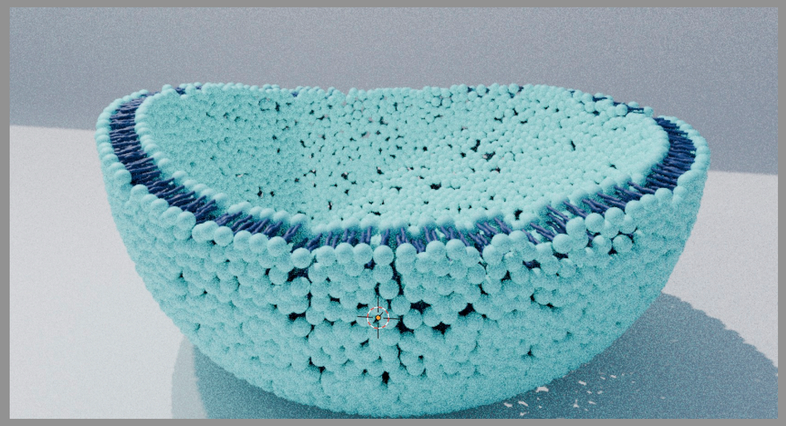
- Use the „Lipids“ asset
  (find in training materials „lipids_scattering.blend")

Procedural Shapes

Task: Create an advanced membrane





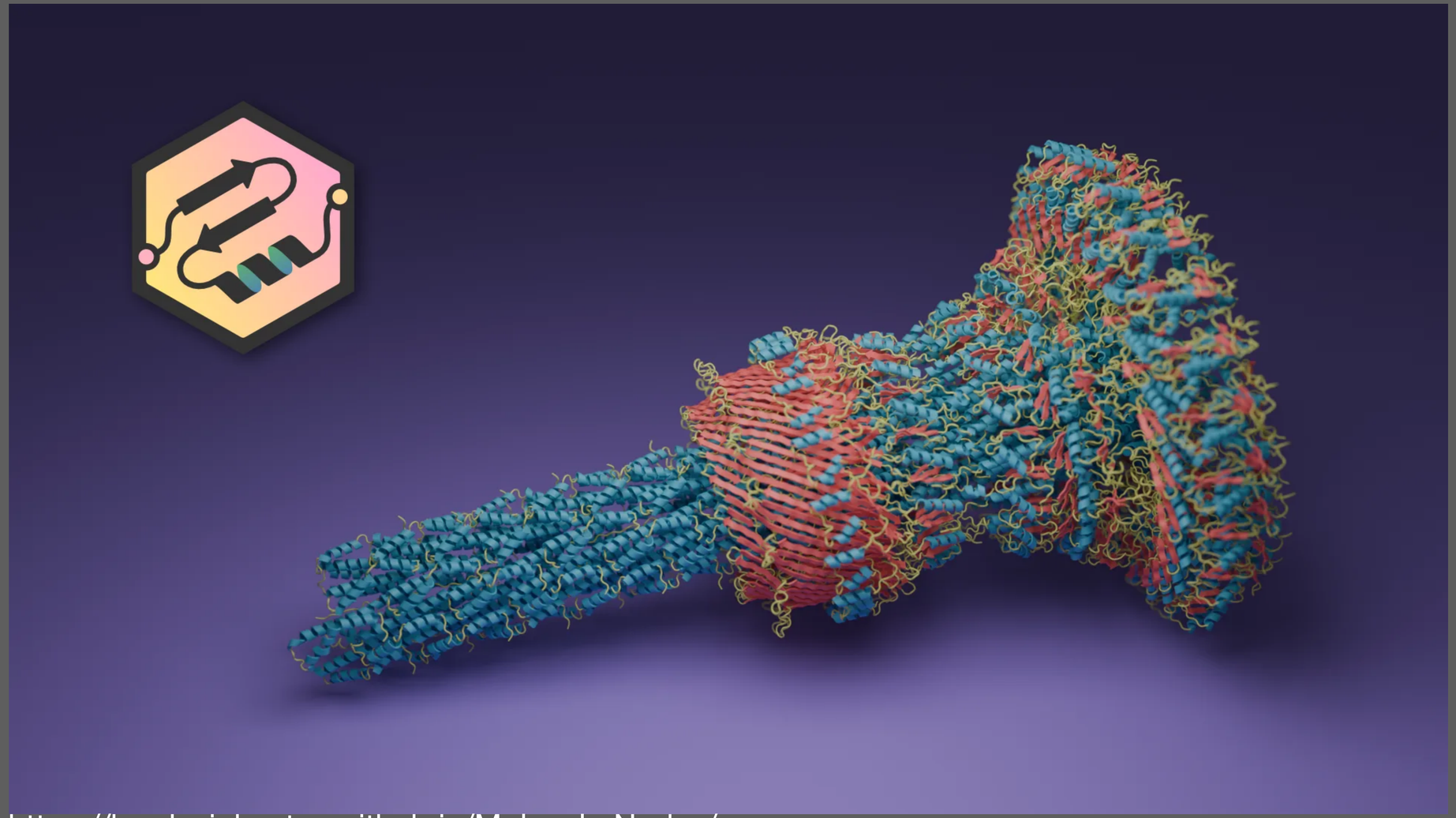


Task:

- Model half-sphere with bumps
- Use Lipid GeoNodes Tree
- Setup Materials & Lights

Procedural Shapes - Molecular Nodes

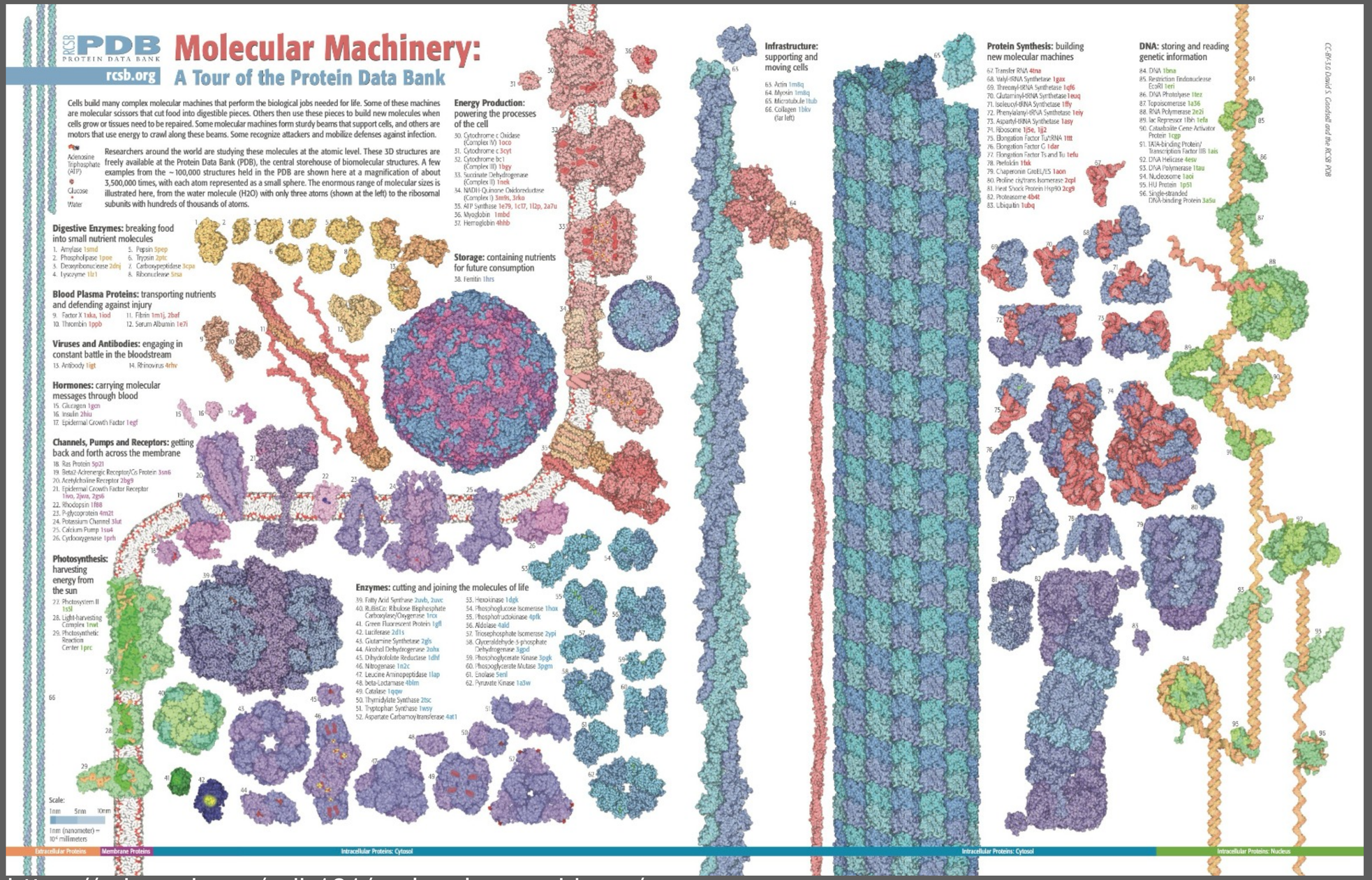
Blender Extension



Brady Johnston

https://bradyajohnston.github.io/MolecularNodes/

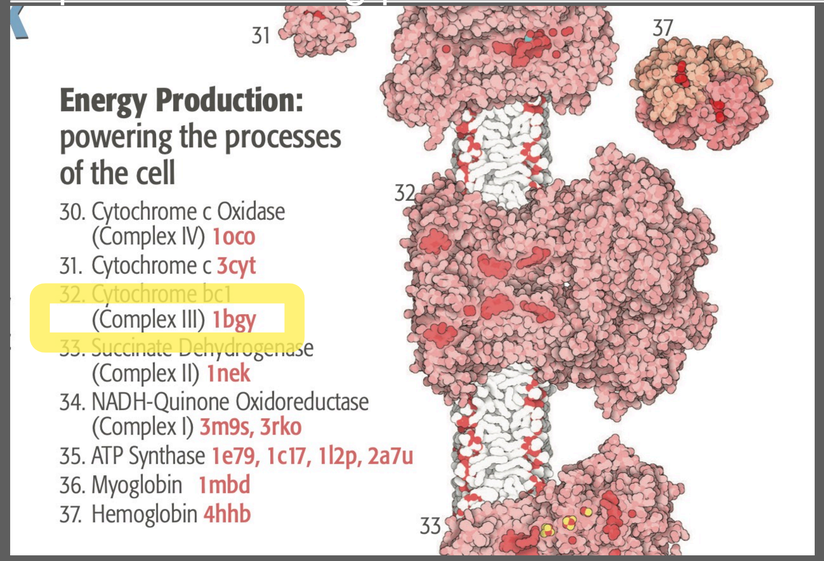
Procedural Shapes - Molecular Nodes

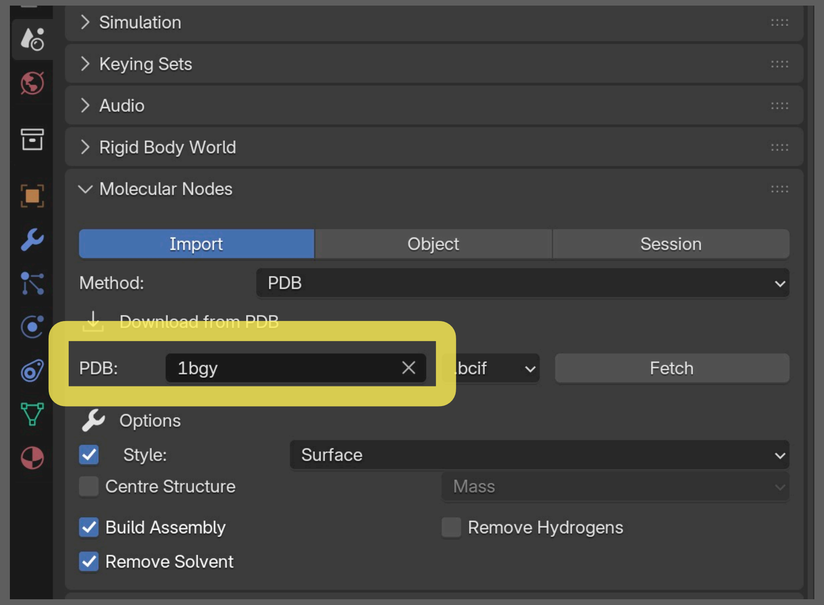


https://cdn.rcsb.org/pdb101/molecular-machinery/

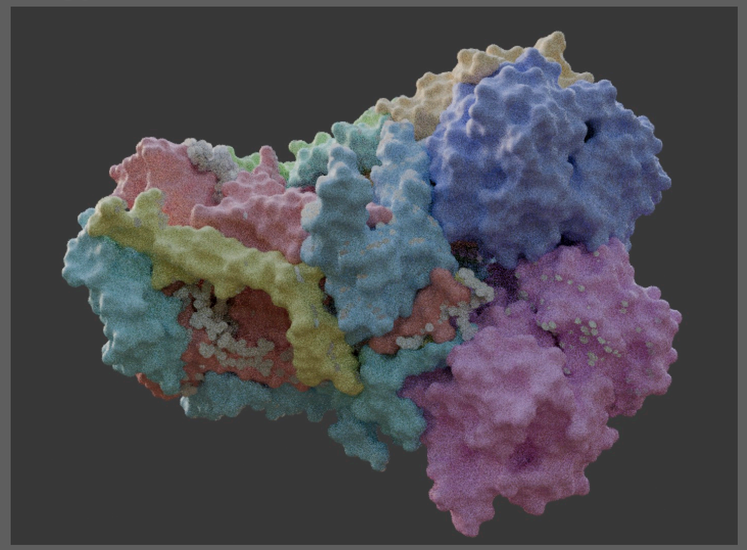
Procedural Shapes - Molecular Nodes

https://cdn.rcsb.org/pdb101/molecular-machinery/



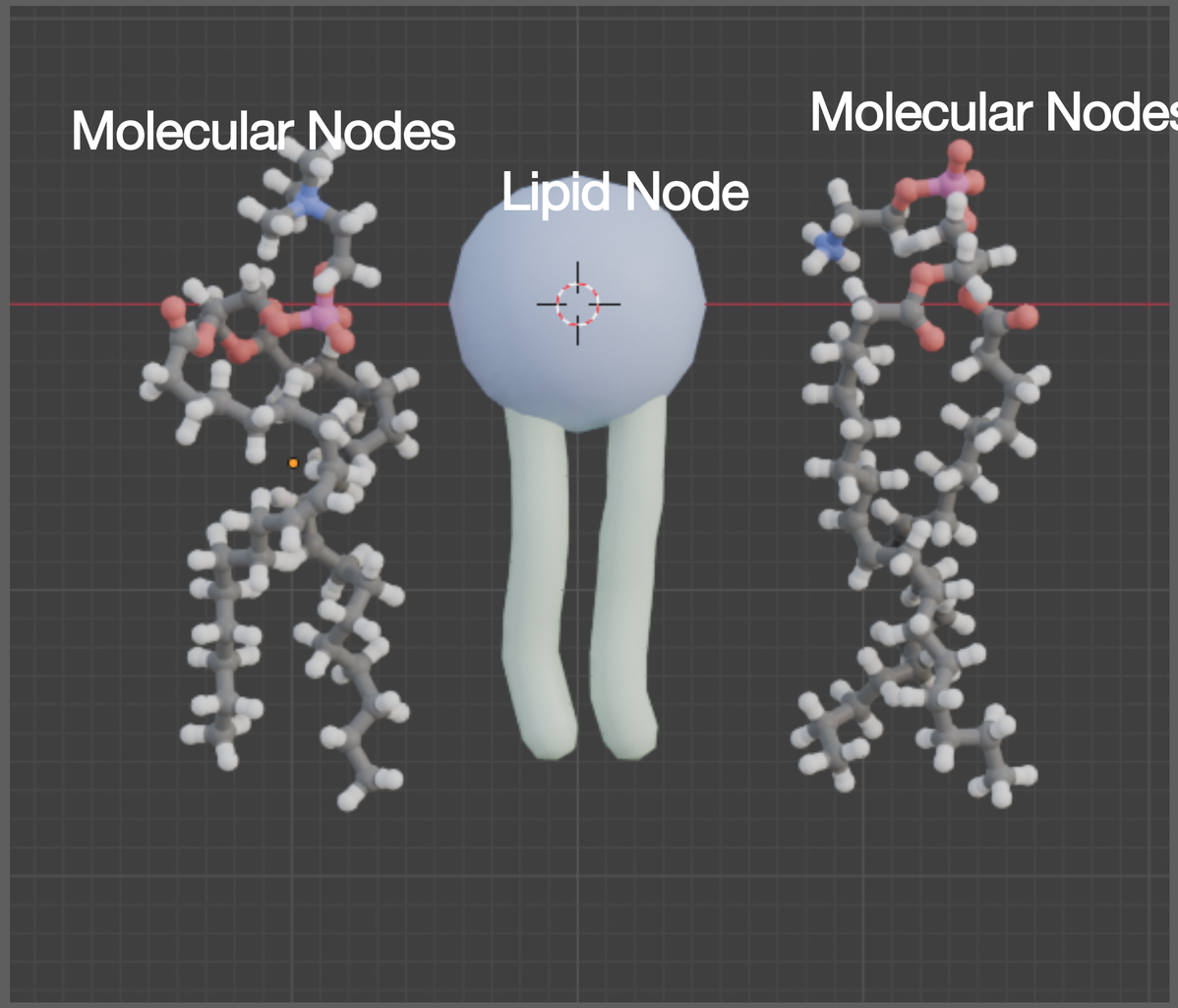


1bgy in Blender



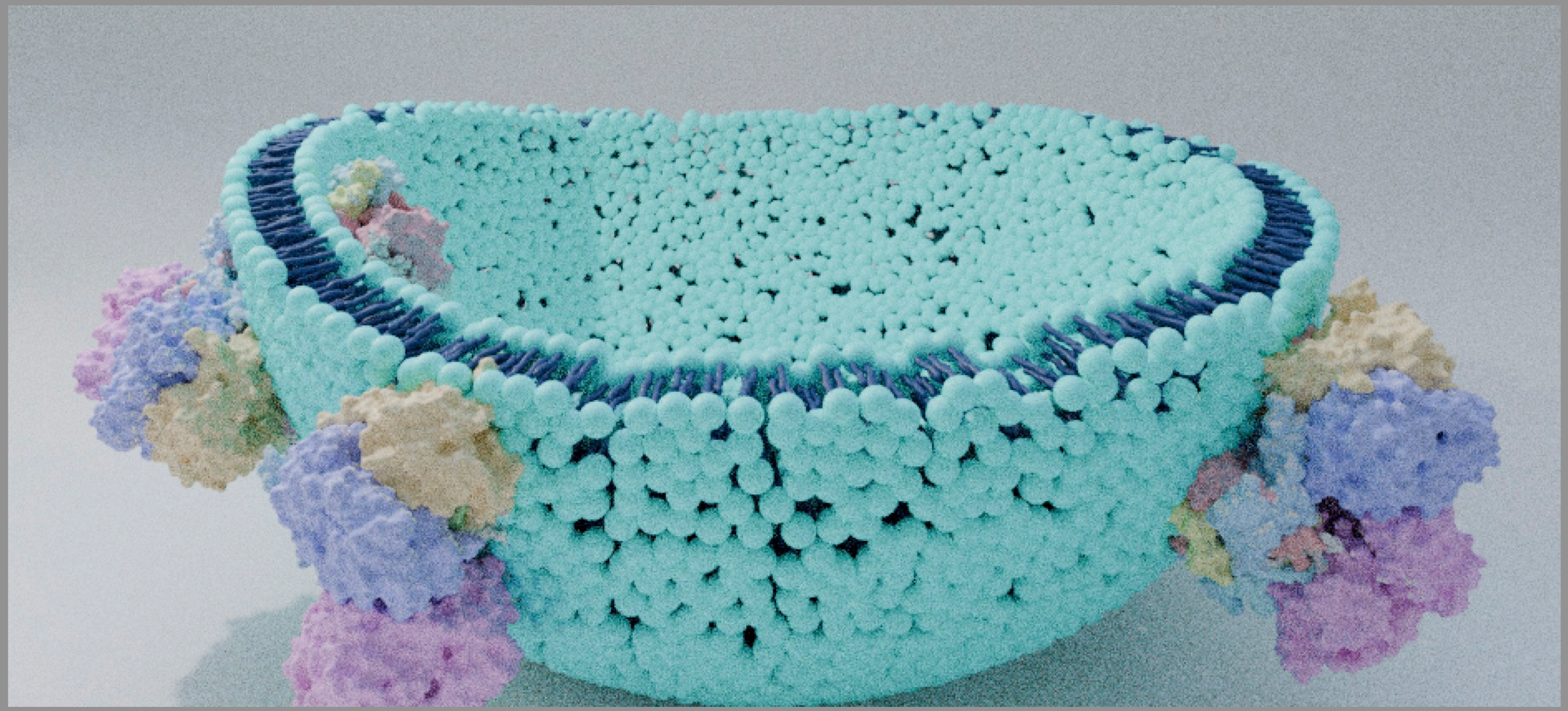
Procedural Shapes - Molecular Nodes

Size Comparison



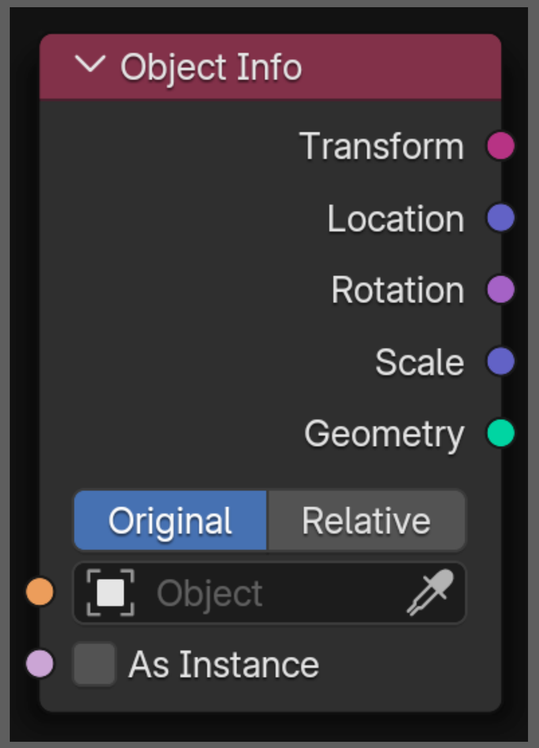
Procedural Shapes - Molecular Nodes

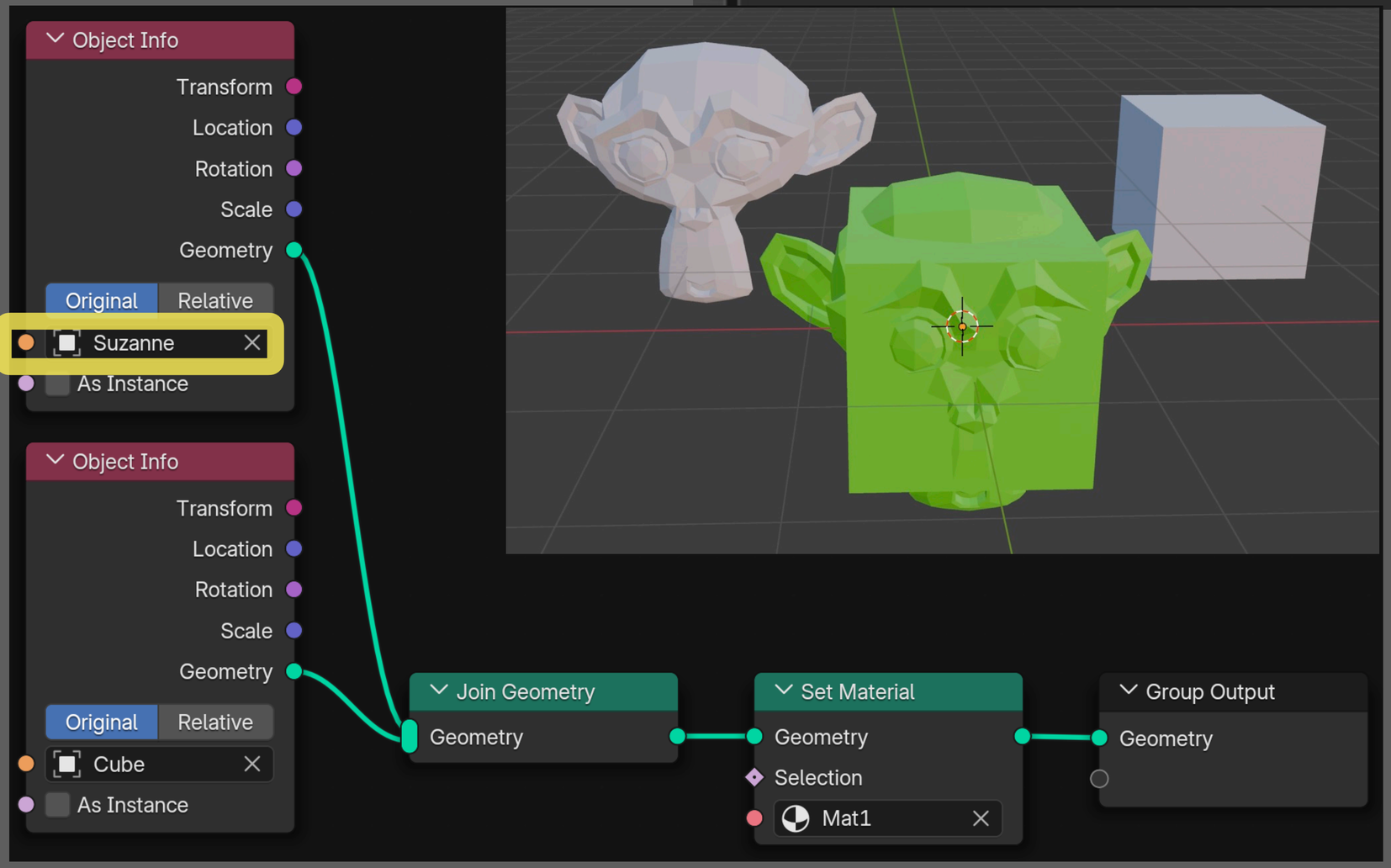
Task: Place proteins on the membrane surface

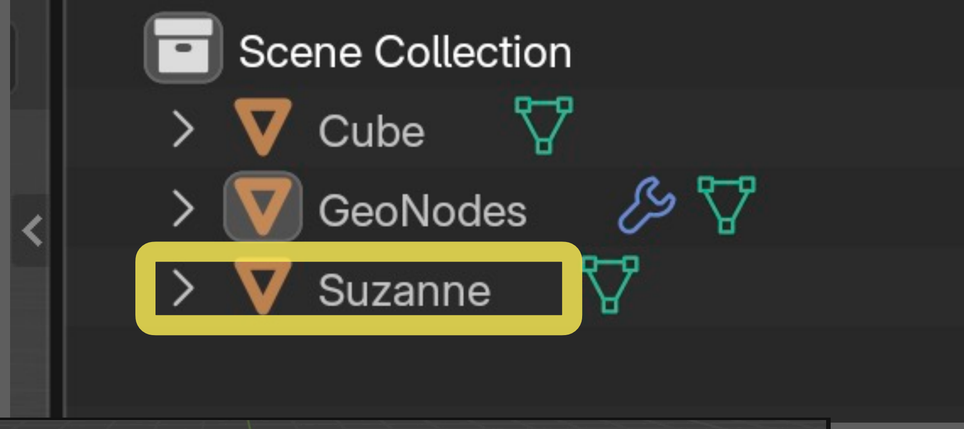


Procedural Shapes

Object Info

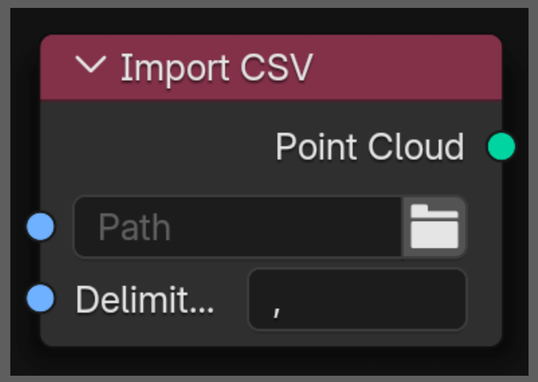


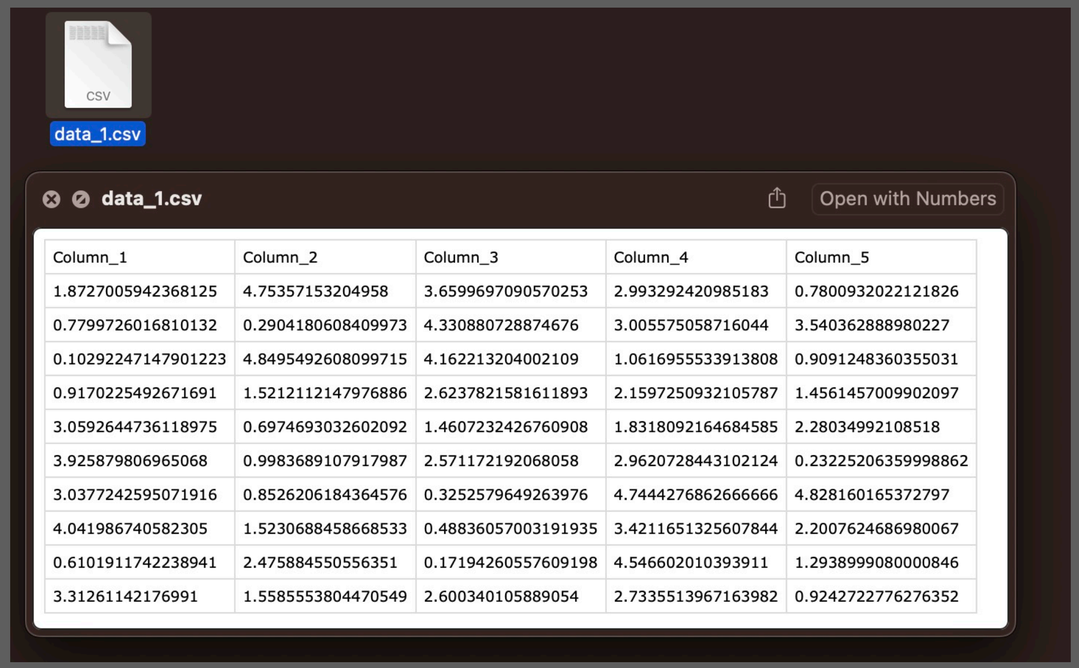




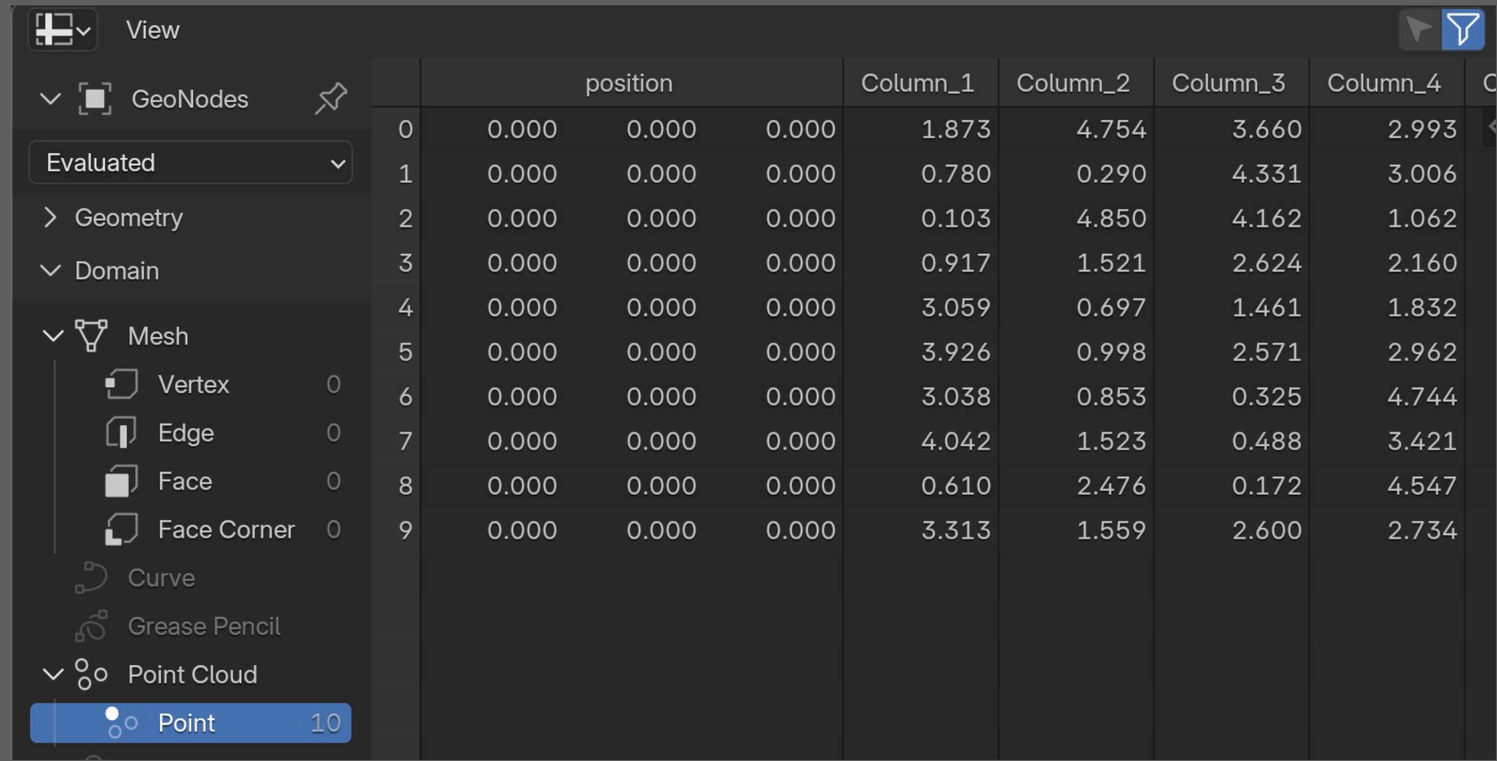
Procedural Shapes

CSV Import





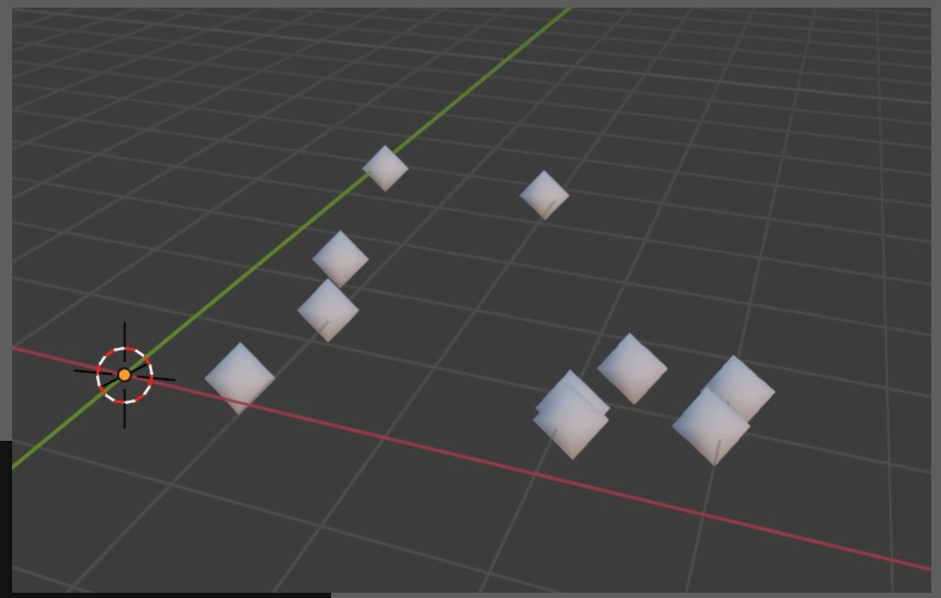
Column_1	Column_2	Column_3	Column_4	Column_5
1.8727005942368125	4.75357153204958	3.6599697090570253	2.993292420985183	0.7800932022121826
0.7799726016810132	0.2904180608409973	4.330880728874676	3.005575058716044	3.540362888980227
0.10292247147901223	4.8495492608099715	4.162213204002109	1.0616955533913808	0.9091248360355031
0.9170225492671691	1.5212112147976886	2.6237821581611893	2.1597250932105787	1.4561457009902097
3.0592644736118975	0.6974693032602092	1.4607232426760908	1.8318092164684585	2.28034992108518
3.925879806965068	0.9983689107917987	2.571172192068058	2.9620728443102124	0.23225206359998862
3.0377242595071916	0.8526206184364576	0.3252579649263976	4.7444276862666666	4.828160165372797
4.041986740582305	1.5230688458668533	0.48836057003191935	3.4211651325607844	2.2007624686980067
0.6101911742238941	2.475884550556351	0.17194260557609198	4.546602010393911	1.2938999080000846
3.31261142176991	1.5585553804470549	2.600340105889054	2.7335513967163982	0.9242722776276352

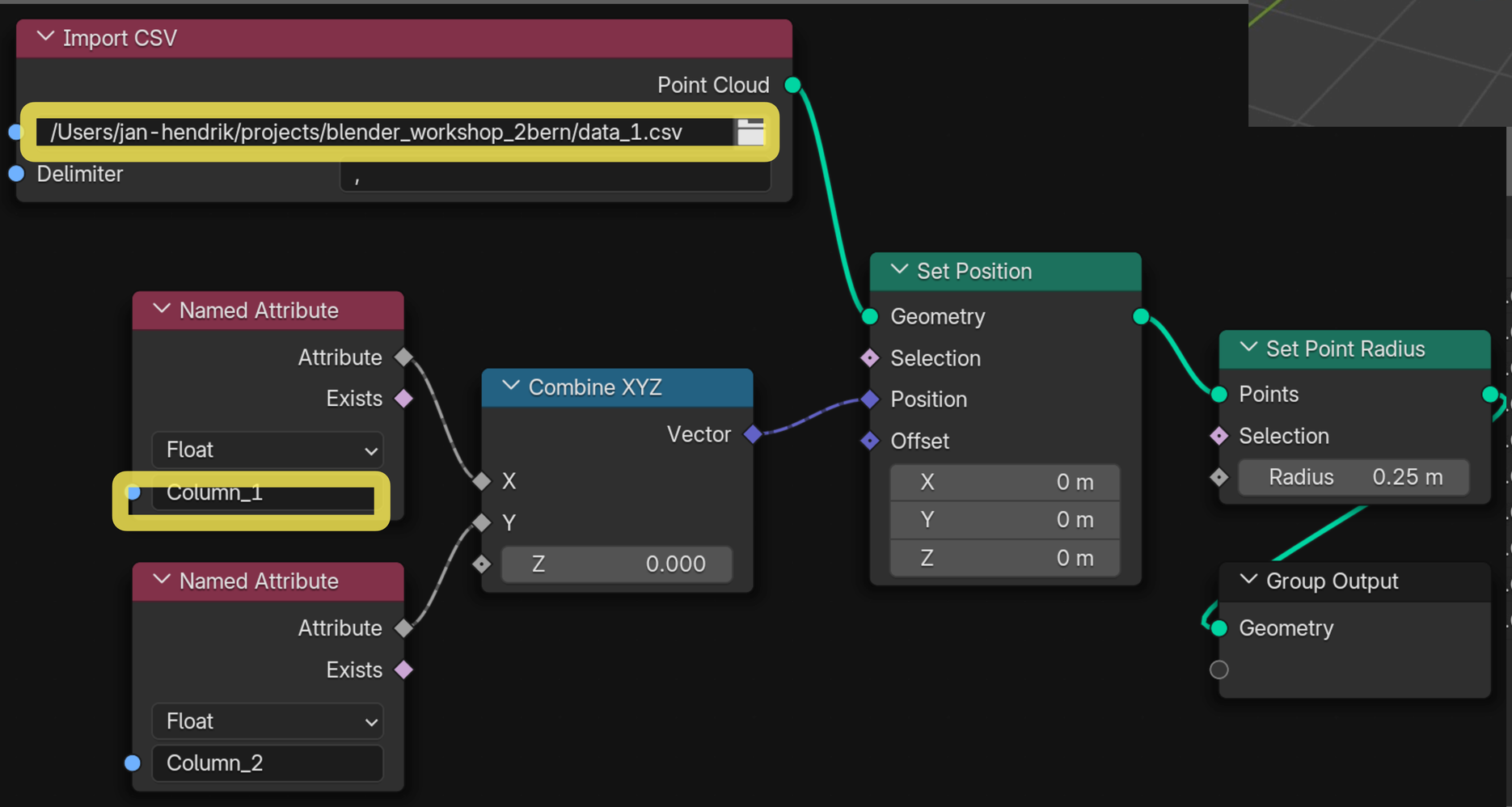


	position			Column_1	Column_2	Column_3	Column_4
0	0.000	0.000	0.000	1.873	4.754	3.660	2.993
1	0.000	0.000	0.000	0.780	0.290	4.331	3.006
2	0.000	0.000	0.000	0.103	4.850	4.162	1.062
3	0.000	0.000	0.000	0.917	1.521	2.624	2.160
4	0.000	0.000	0.000	3.059	0.697	1.461	1.832
5	0.000	0.000	0.000	3.926	0.998	2.571	2.962
6	0.000	0.000	0.000	3.038	0.853	0.325	4.744
7	0.000	0.000	0.000	4.042	1.523	0.488	3.421
8	0.000	0.000	0.000	0.610	2.476	0.172	4.547
9	0.000	0.000	0.000	3.313	1.559	2.600	2.734

Procedural Shapes

CSV Import

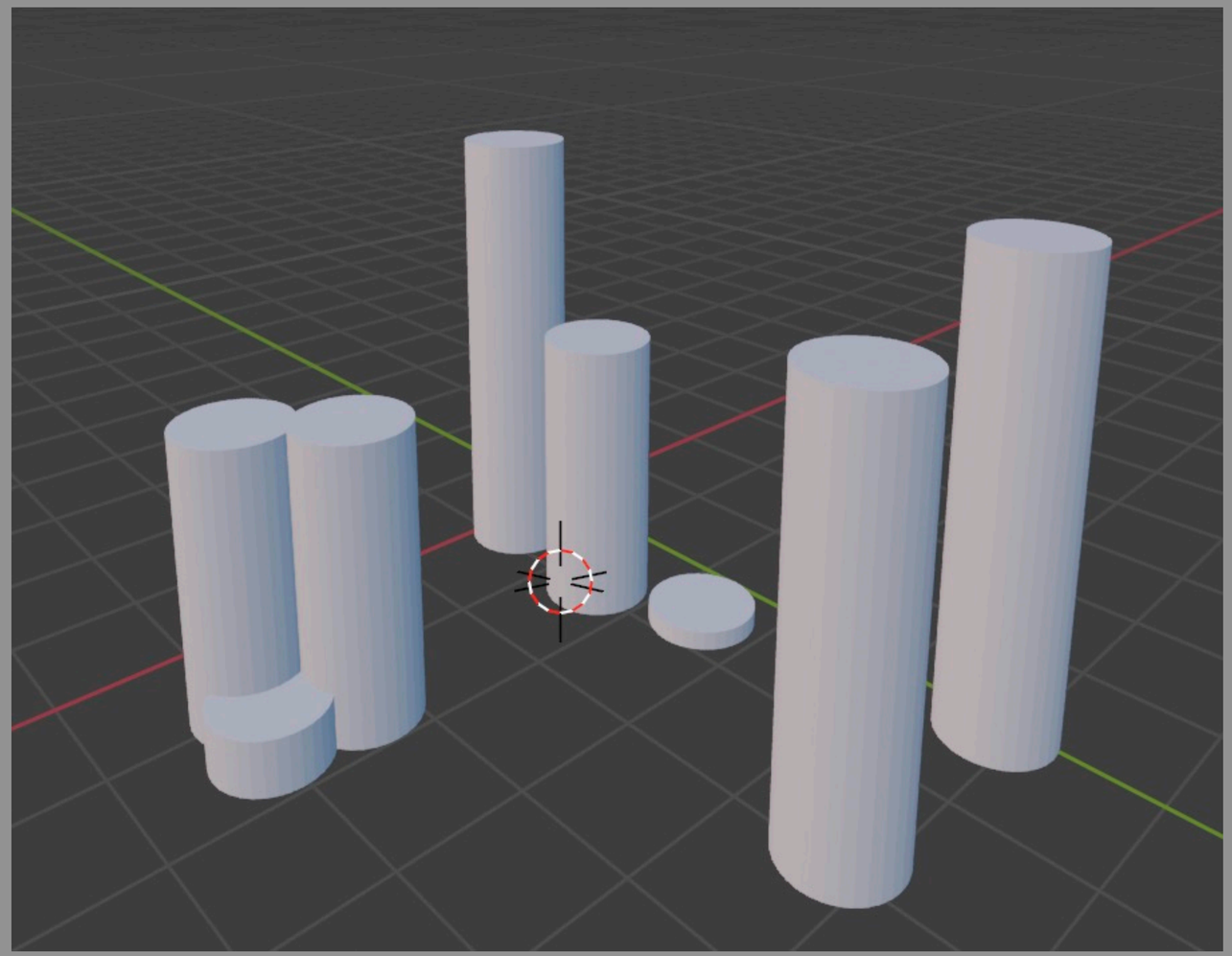




	Column_1	Column_2	Column_3	Column_4
.000	1.873	4.754	3.660	2.993
.000	0.780	0.290	4.331	3.006
.000	0.103	4.850	4.162	1.062
.000	0.917	1.521	2.624	2.160
.000	3.059	0.697	1.461	1.832
.000	3.926	0.998	2.571	2.962
.000	3.038	0.853	0.325	4.744
.000	4.042	1.523	0.488	3.421
.000	0.610	2.476	0.172	4.547
.000	3.313	1.559	2.600	2.734

Procedural Shapes

Task: Create this 3D bar chart

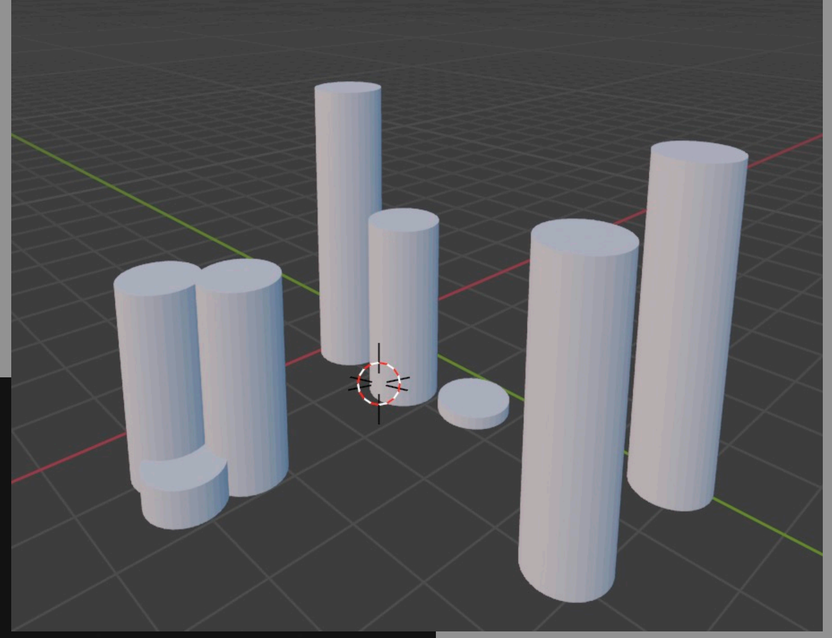


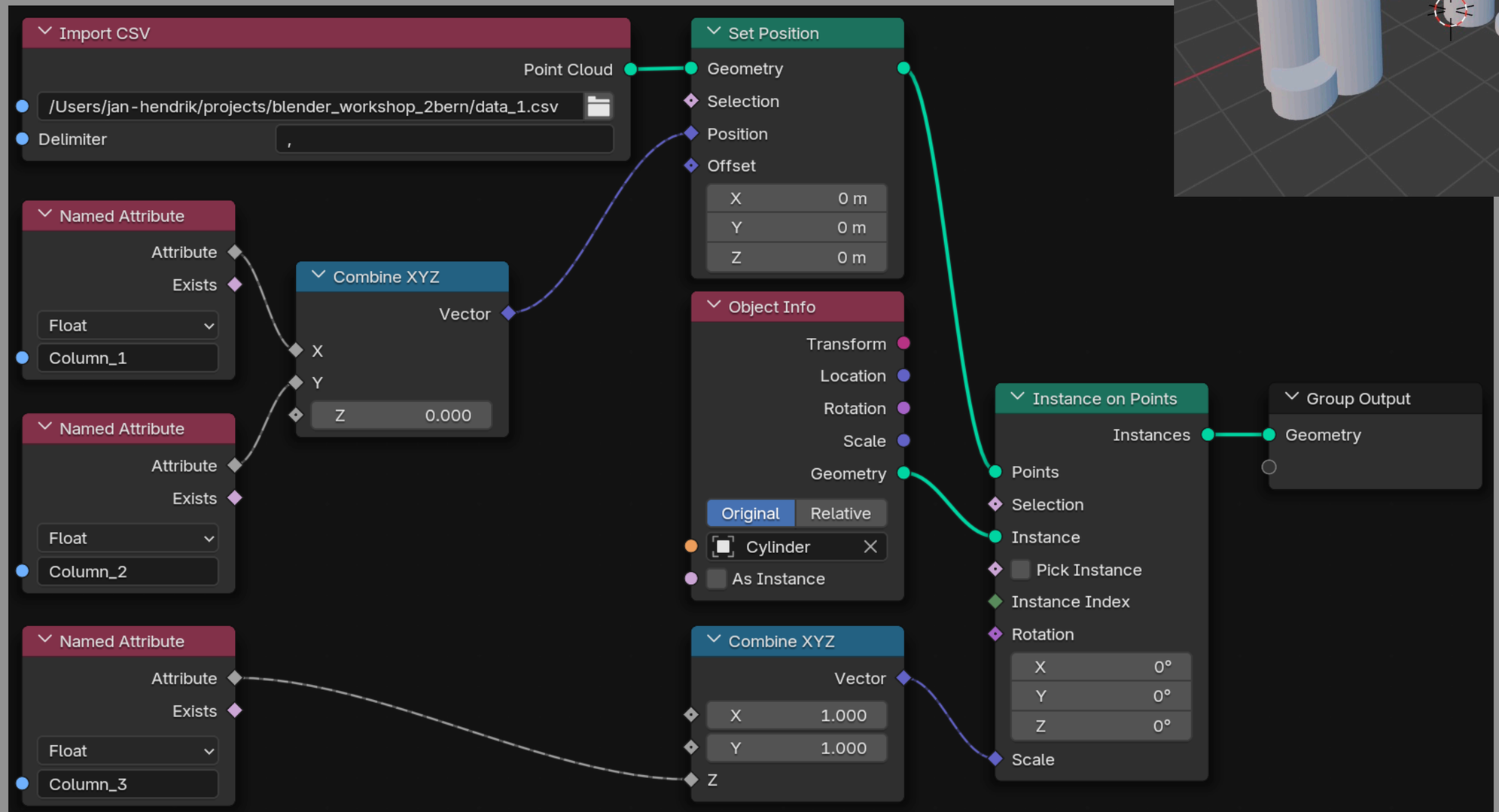
Task:

- Import „data_1.csv“
- Model a cylinder. Add it via Object info node. (Make sure the origin is at the bottom)
- Use Named Attributs
- x&y position from col1, col2
- Height from col3

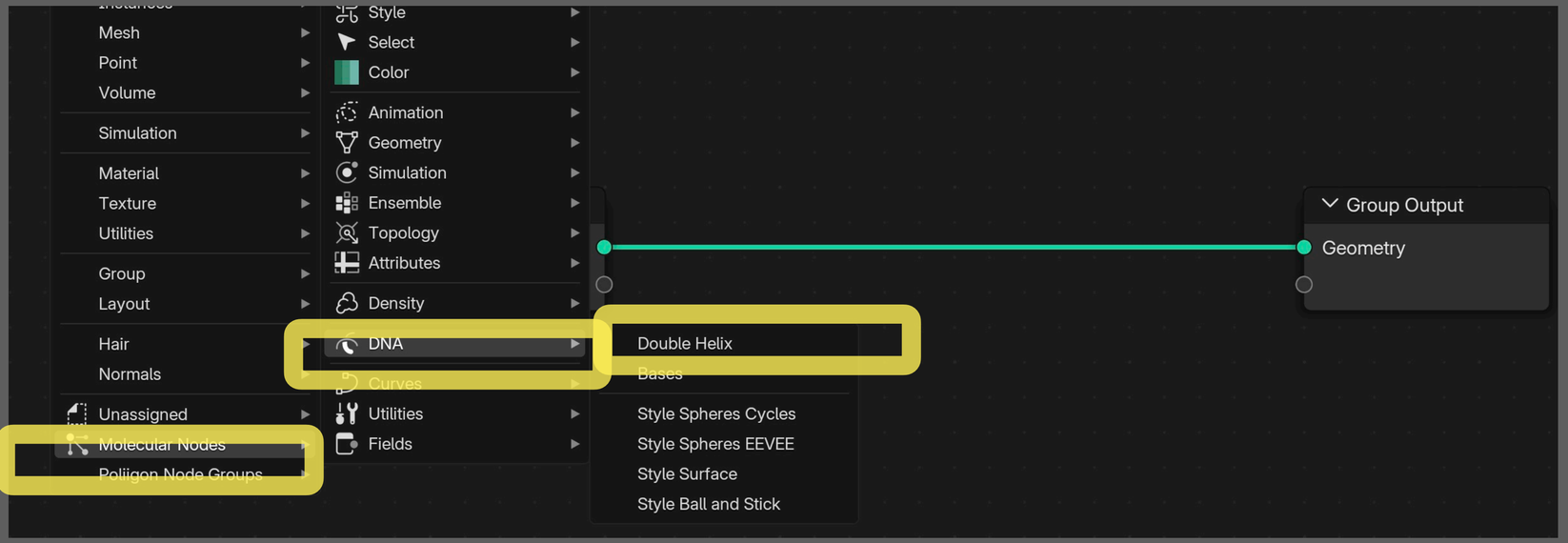
Procedural Shapes

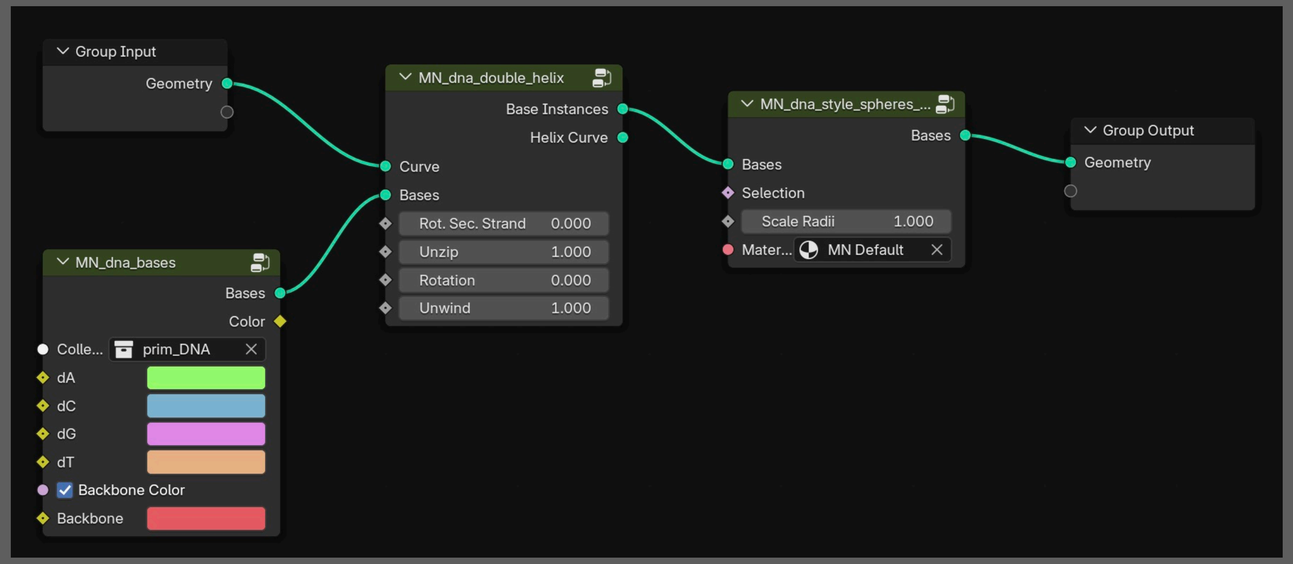
Task: Create this 3D bar chart

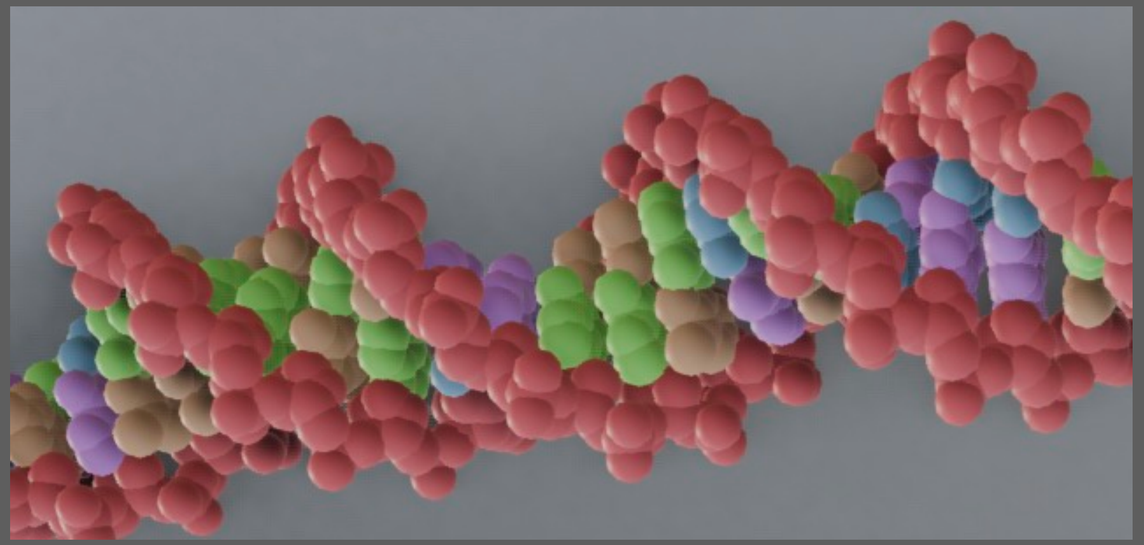




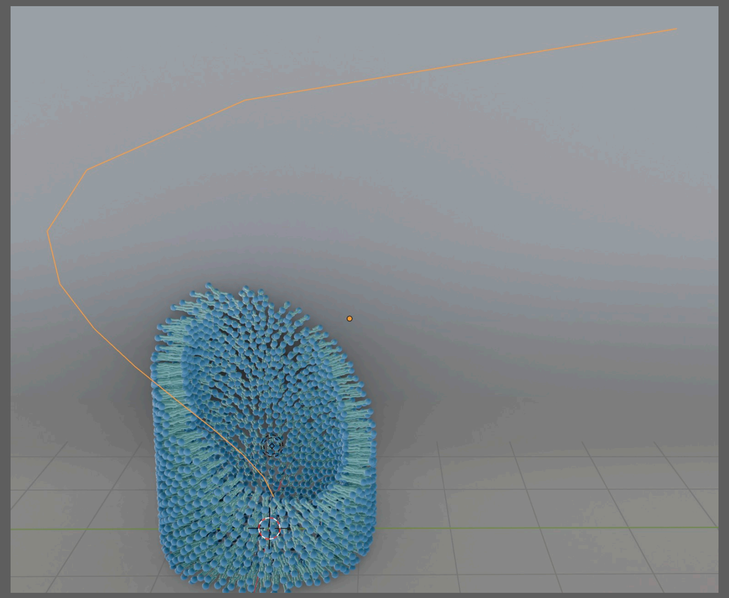
Procedural Shapes - Molecular Nodes - DNA

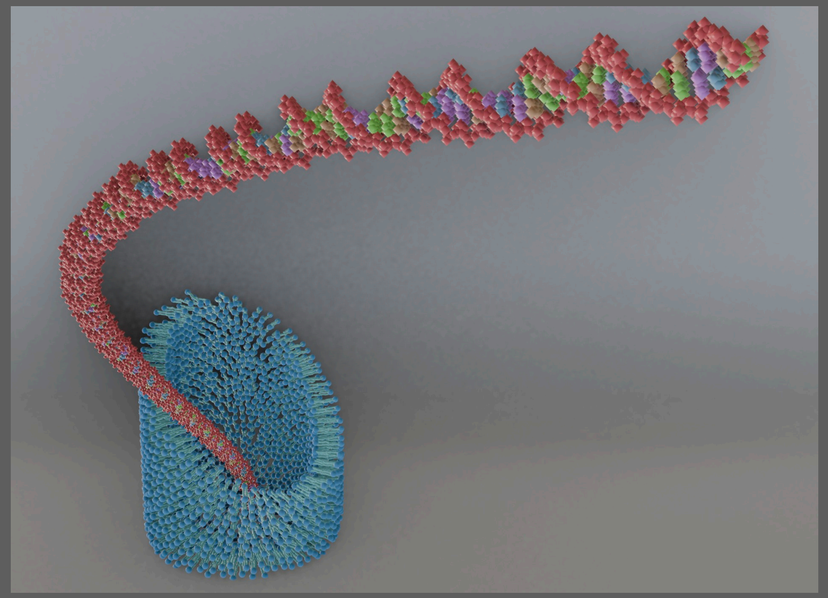


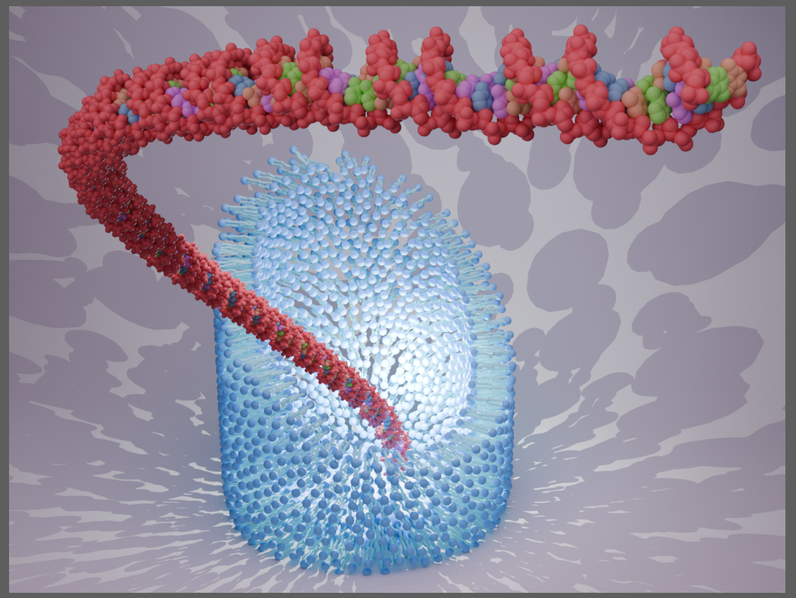




Procedural Shapes - Molecular Nodes - DNA

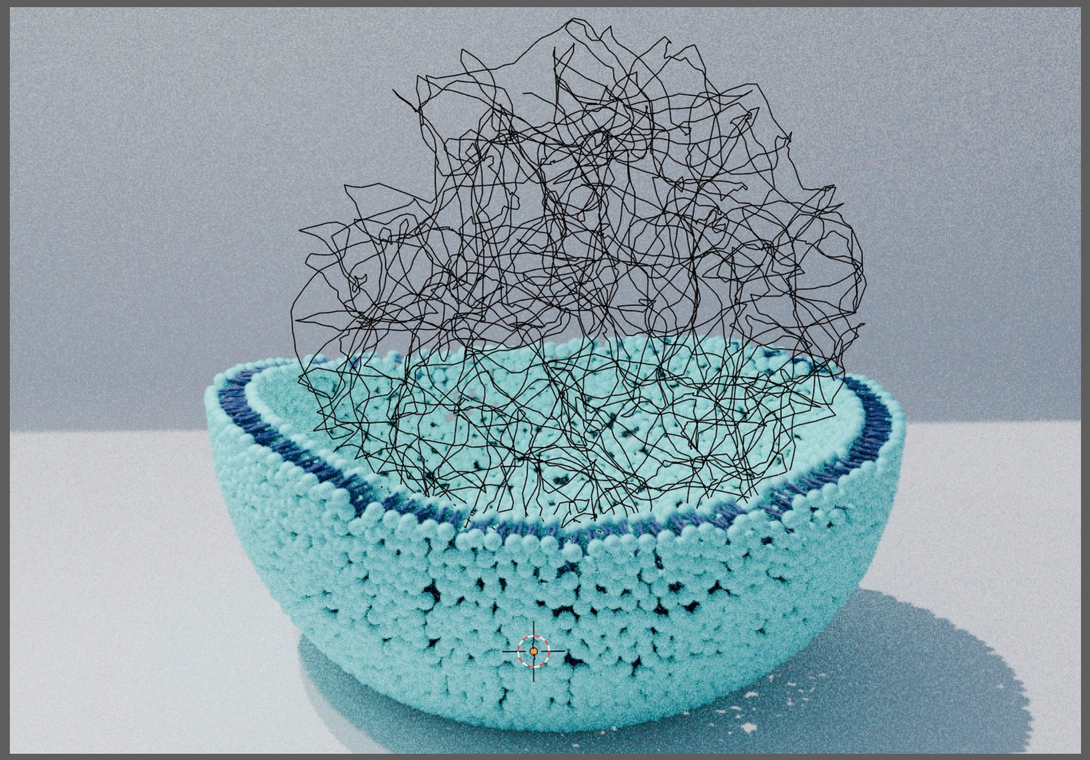


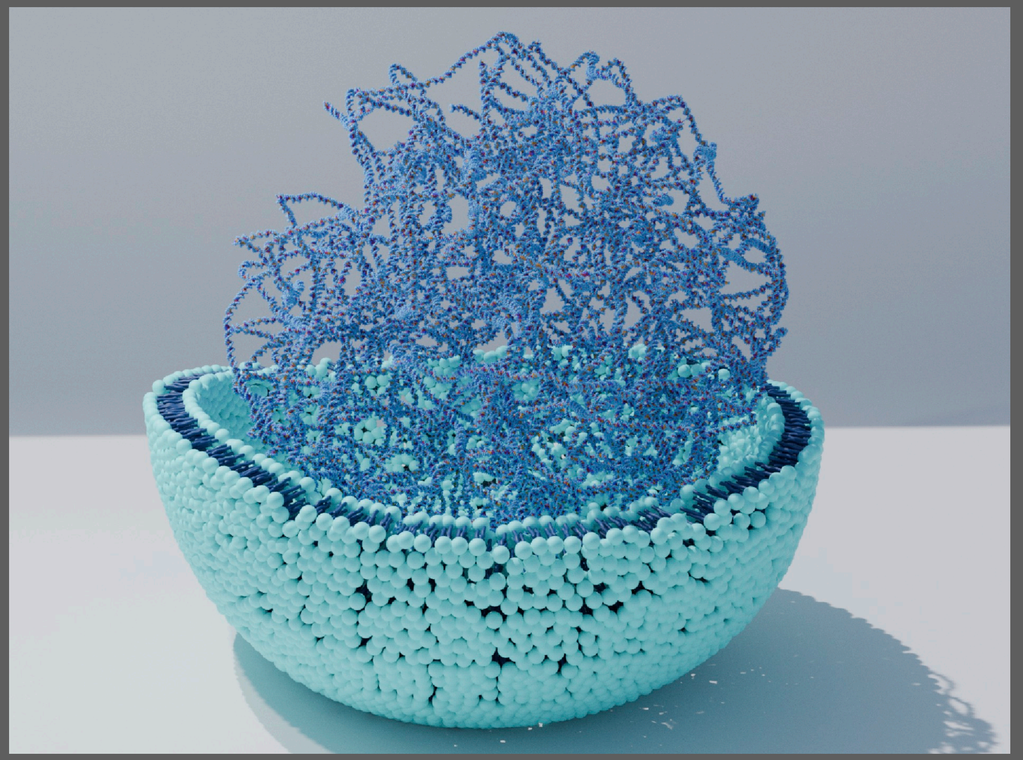




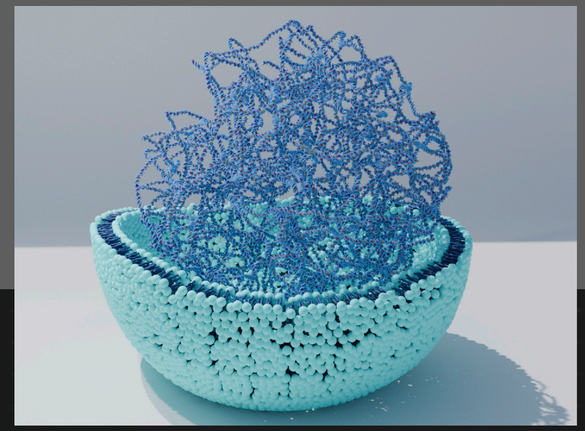
Procedural Shapes - Molecular Nodes - DNA

CSV generated with a self-avoiding worm-like chain model.





Procedural Shapes - Molecular Nodes - DNA



Transforming
points into a curve

Import CSV
Point Cloud
/Users/jan-hendrik/Desktop/dna_wlc_..._R120nm_d3nm_fill50_seed123.csv
Delimiter

Named Attribute
Attribute
Exists
Float
x_nm

Named Attribute
Attribute
Exists
Float
y_nm

Named Attribute
Attribute
Exists
Float
z_nm

Combine XYZ
Vector
X
Y
Z

Value
6.500

Multiply
Value
Multiply
Clamp
Value 0.010
Value

Set Position
Geometry
Selection
Position
Offset

Scale
Vector
Scale
Vector
1.000
1.000
1.000
Scale

Transform Geometry
Components
Geometry
Translation
X 0 m
Y 0 m
Z 0 m
Rotation
X 0°
Y 0°
Z 0°
Scale

Points to Curves
Curves
Points
Curve Group ID
Weight

MN_dna_bases
Bases
Color
Colle... prim_
dA
dC
dG
dT
Backbone Colo
Backbone

MN_dna_double_helix
Base Instances
Helix Curve
Curve
Bases
Rot. Sec. Strand 0.000
Unzip 1.000
Rotation 0.000
Unwind 1.000

MN_dna_style_spheres_...
Bases
Bases
Selection
Scale Radii 1.000
Mater... MN Default....

Group Output
Geometry

Spreadsheet

	position			x_nm	y_nm	z_nm
0	0.000	0.000	0.000	0.000	0.000	0.000
1	0.000	0.000	0.000	-3.071	-0.402	2.531
2	0.000	0.000	0.000	-6.233	-0.842	4.942
3	0.000	0.000	0.000	-8.626	-0.080	8.055
4	0.000	0.000	0.000	-11.399	0.588	10.859
5	0.000	0.000	0.000	-15.299	0.346	11.715
6	0.000	0.000	0.000	-18.264	-0.146	14.355
7	0.000	0.000	0.000	-21.392	-0.101	16.848

Further Resources - Molecular Nodes

Molecular Nodes Tutorial Series

Molecular Nodes

Brady Johnston • Playlist

Molecular Nodes | Getting Started | Blender for Biochemists | Geometry Nodes · 14:10

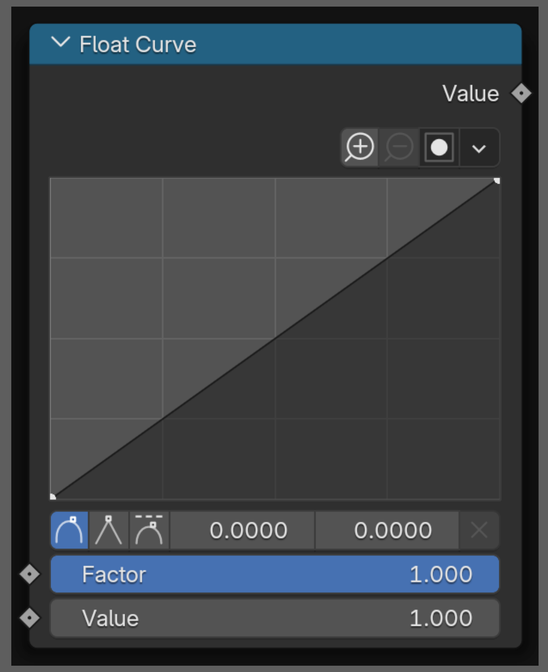
Molecular Nodes | Animation Proteins | Blender for Biochemists | Geometry Nodes · 14:52

View full playlist

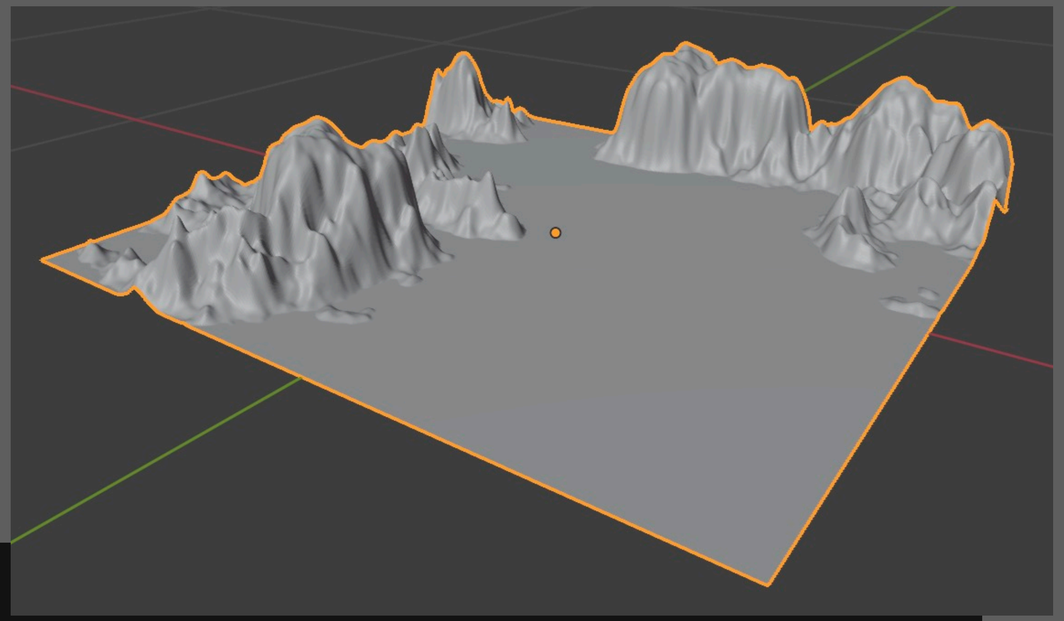
https://www.youtube.com/watch?v=CvmFaRVmZRU&list=PLQyfz7398elUYMdeaSYVAcXffzlSIzuSw

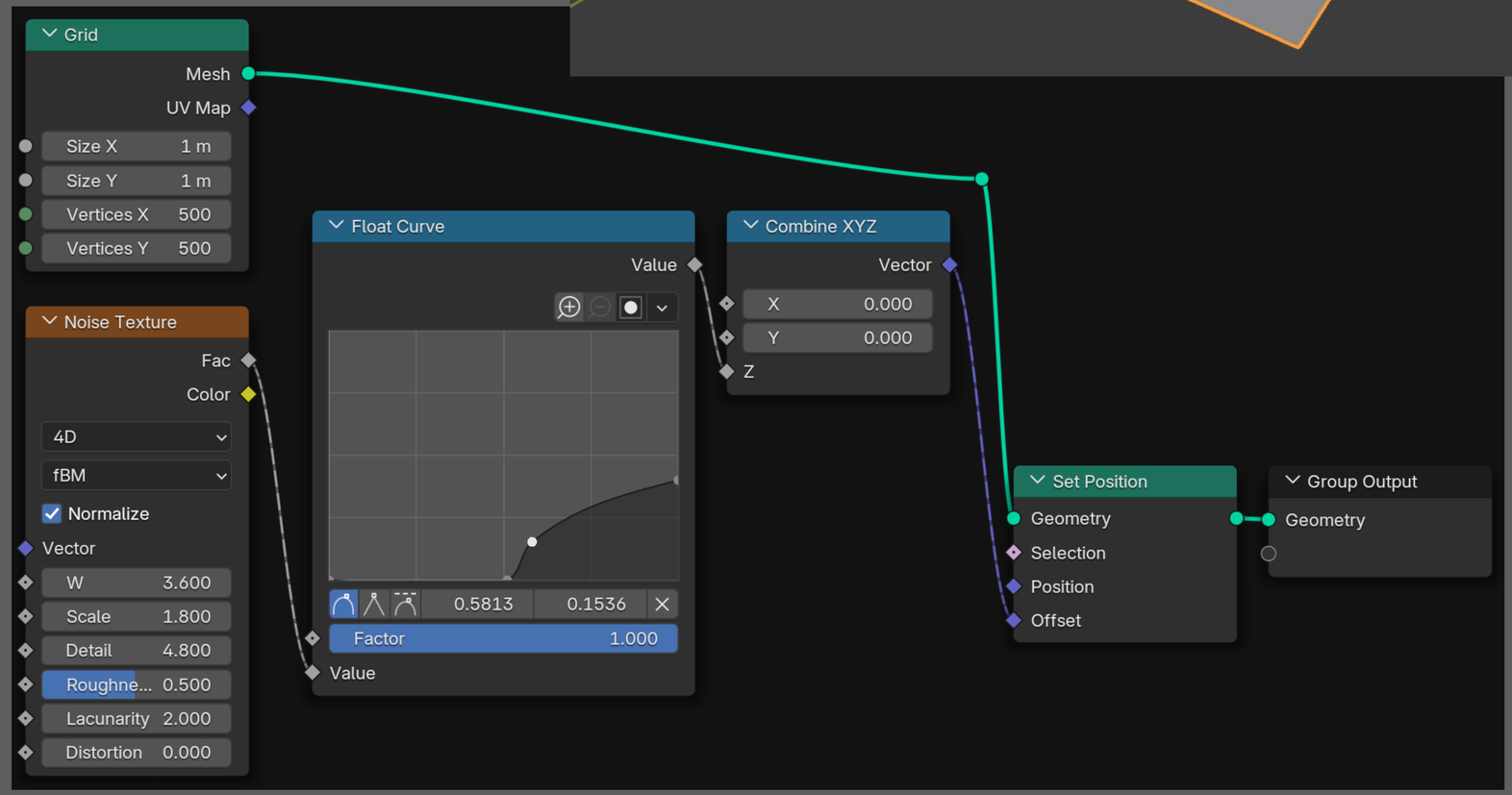
Procedural Shapes

Float Curve



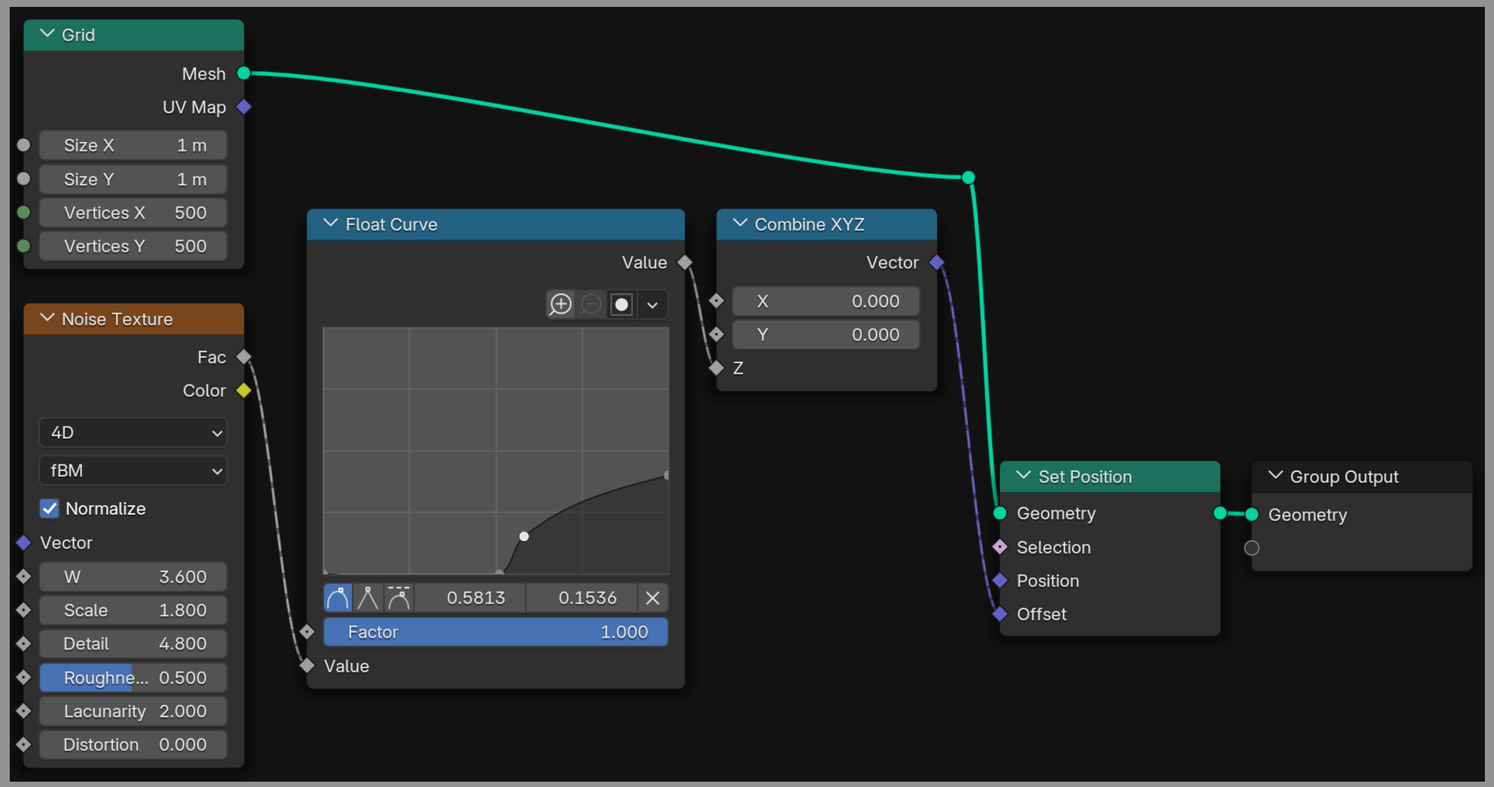
Maps the input value to new output values

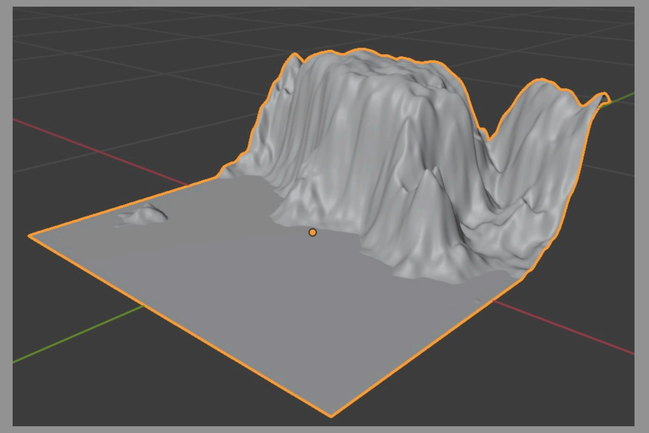


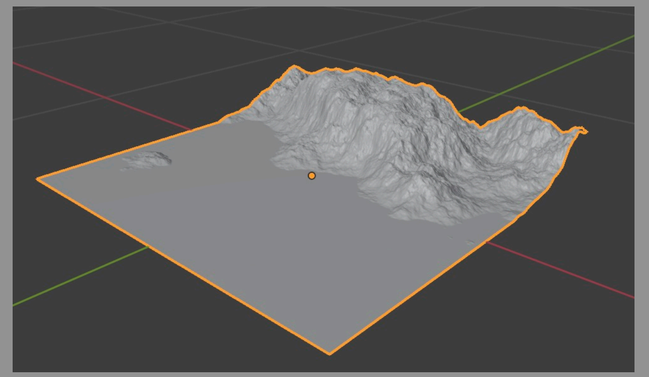


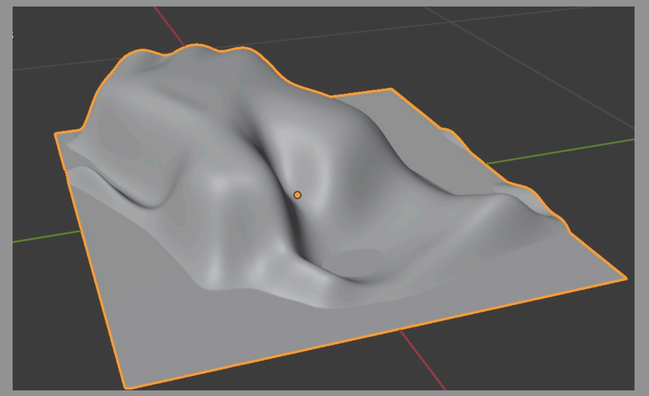
Procedural Shapes
Float Curve

Task: Create your own 3D terrain



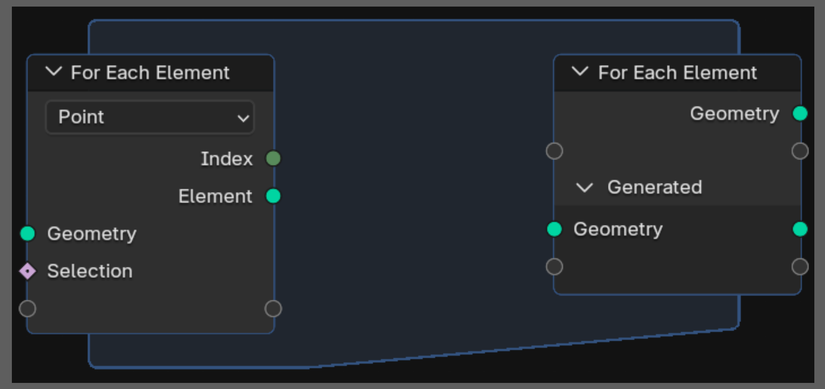




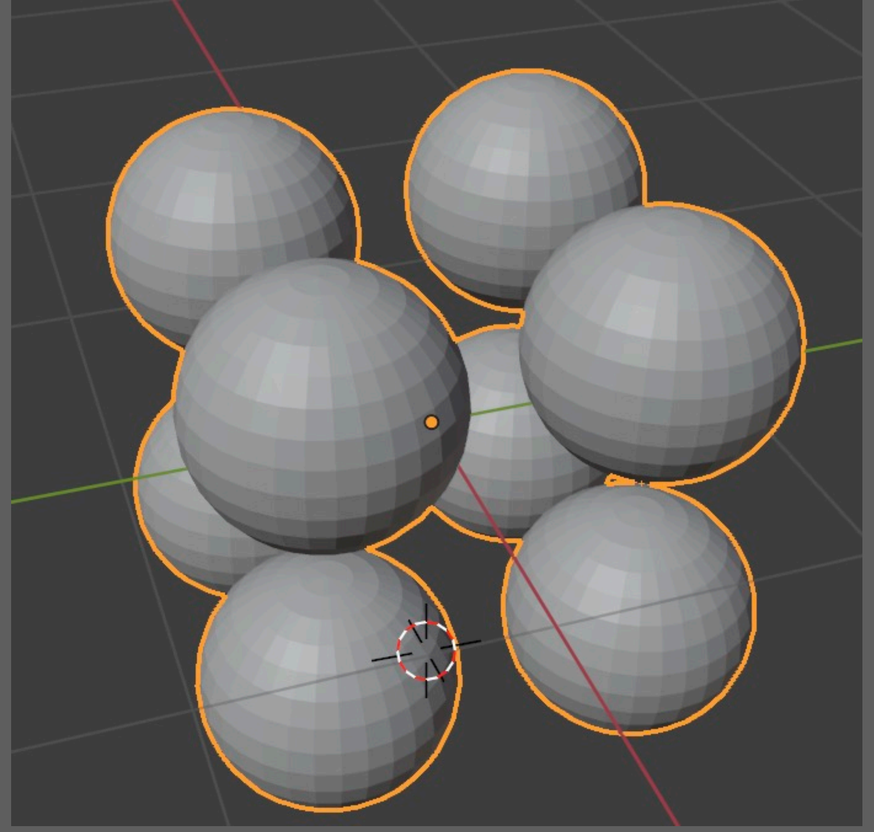


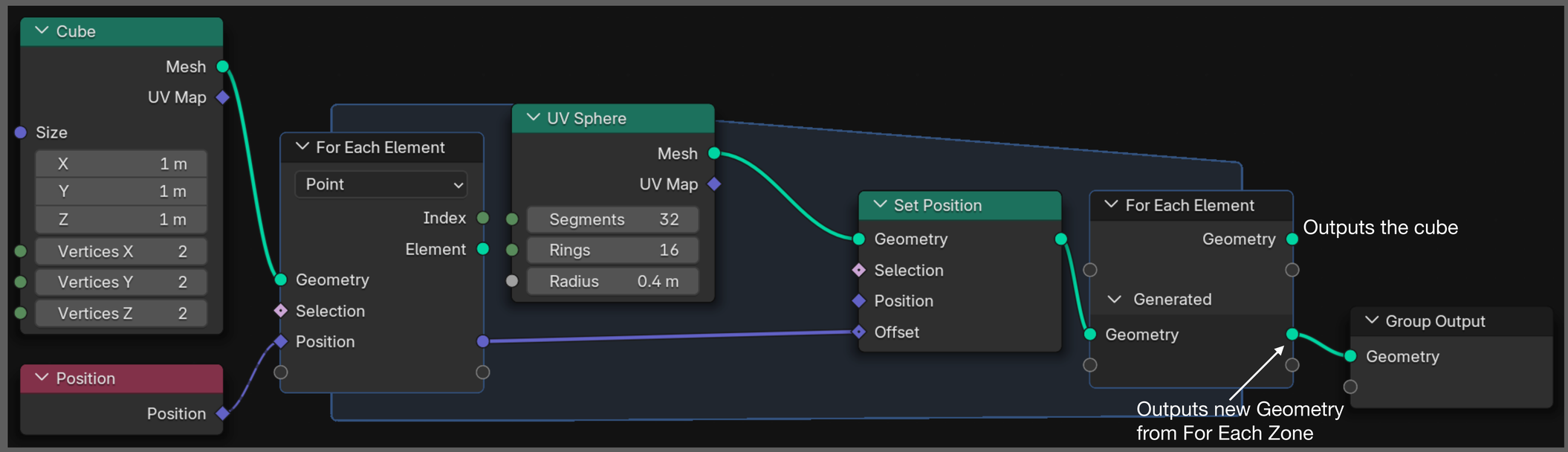
Procedural Shapes

For Each Zone



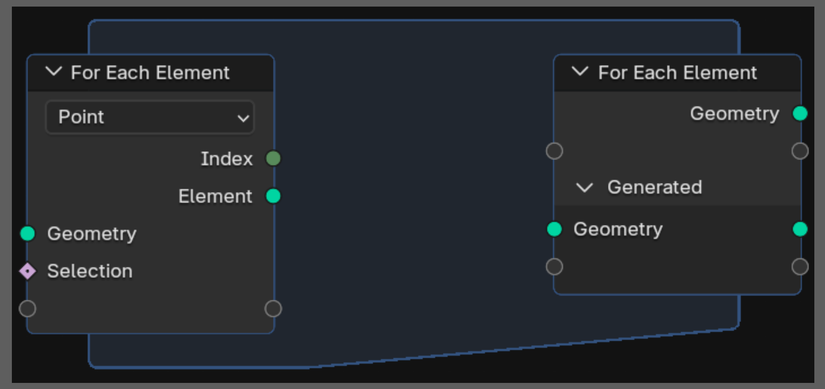
Iterates over every point in the geometry via field

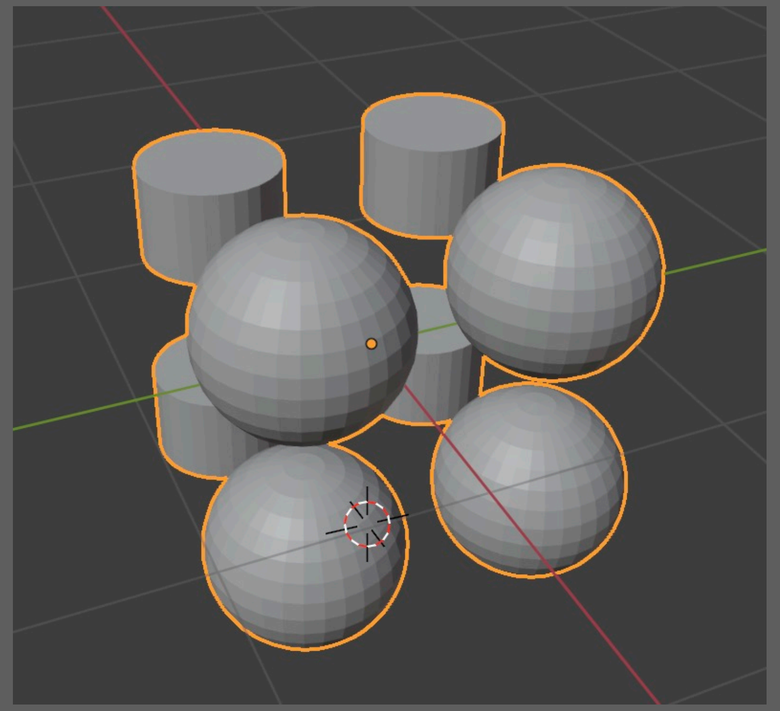


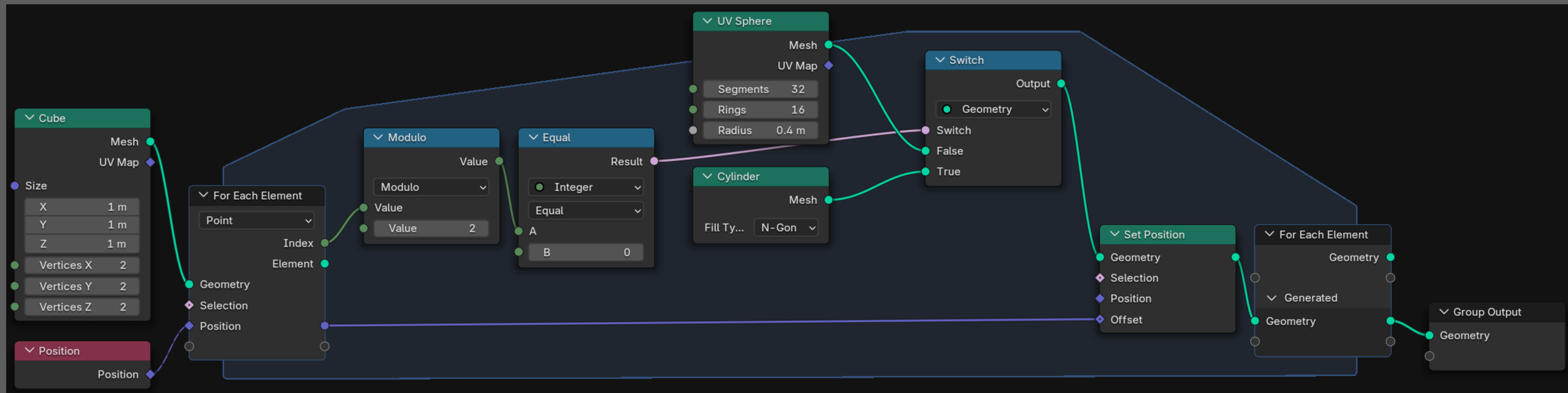


Procedural Shapes

For Each Zone





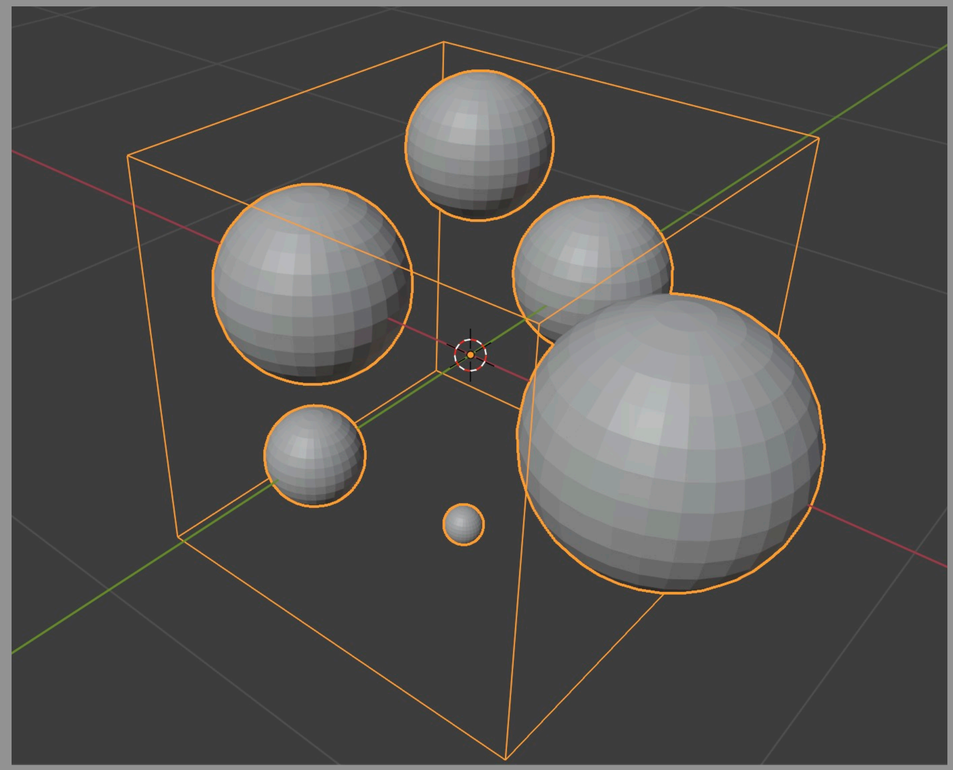


Procedural Shapes

For Each Zone

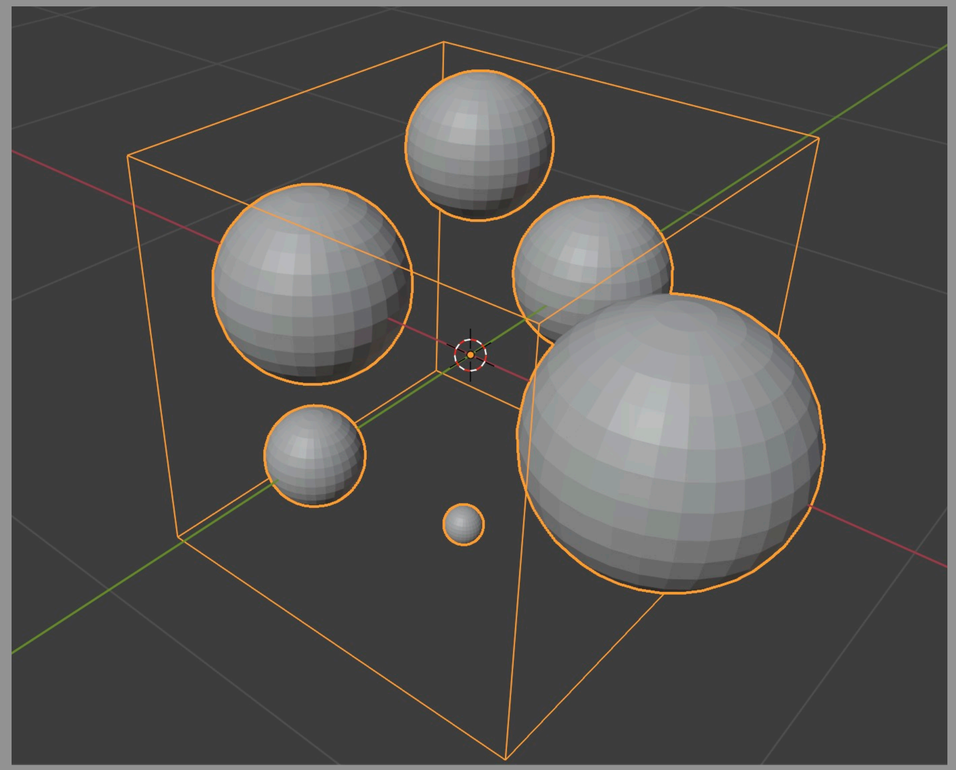
Task:

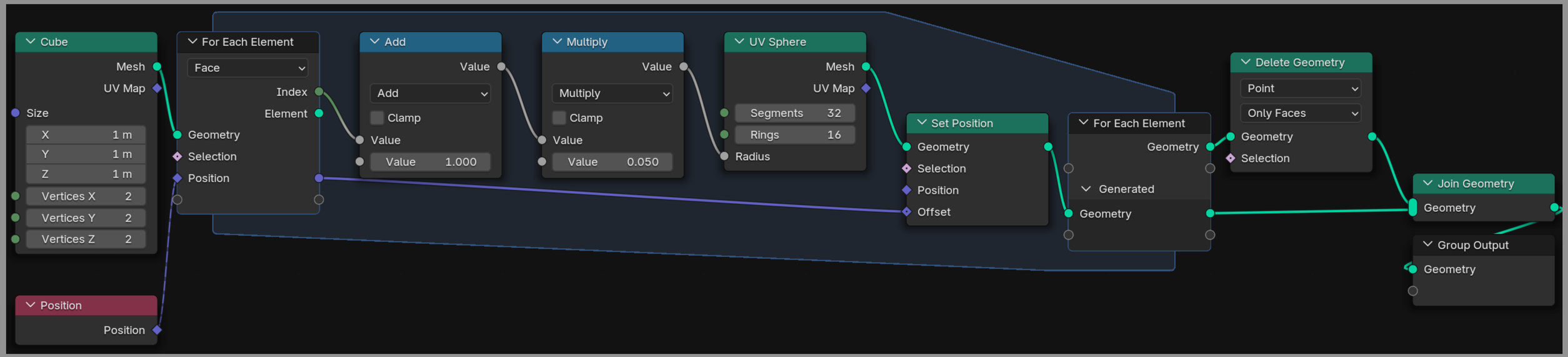
- Place spheres on the faces of a cube
- Scale their size based on the index of the face



Procedural Shapes
For Each Zone

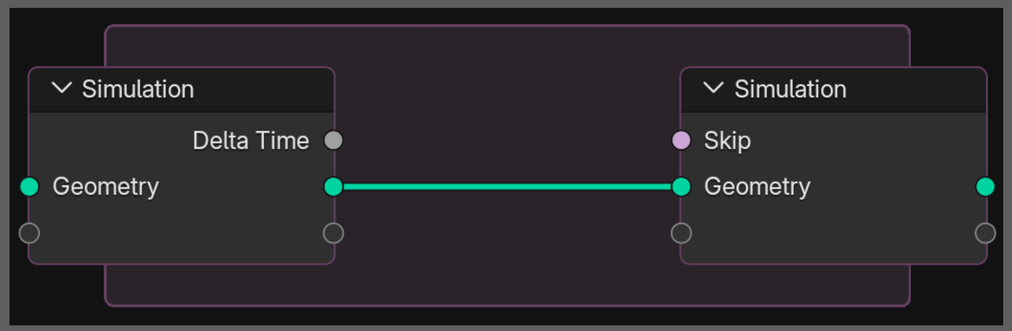
Solution

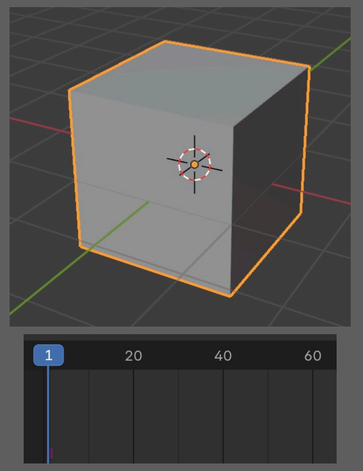




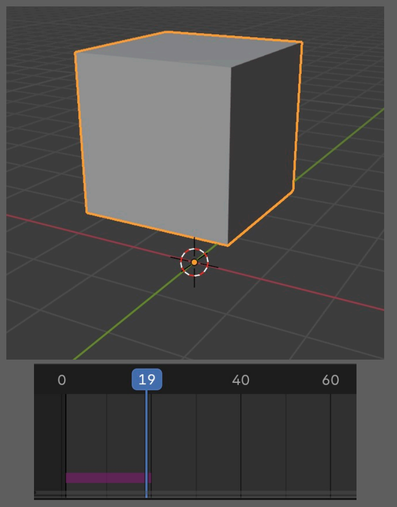
Procedural Shapes

Simulation Zone

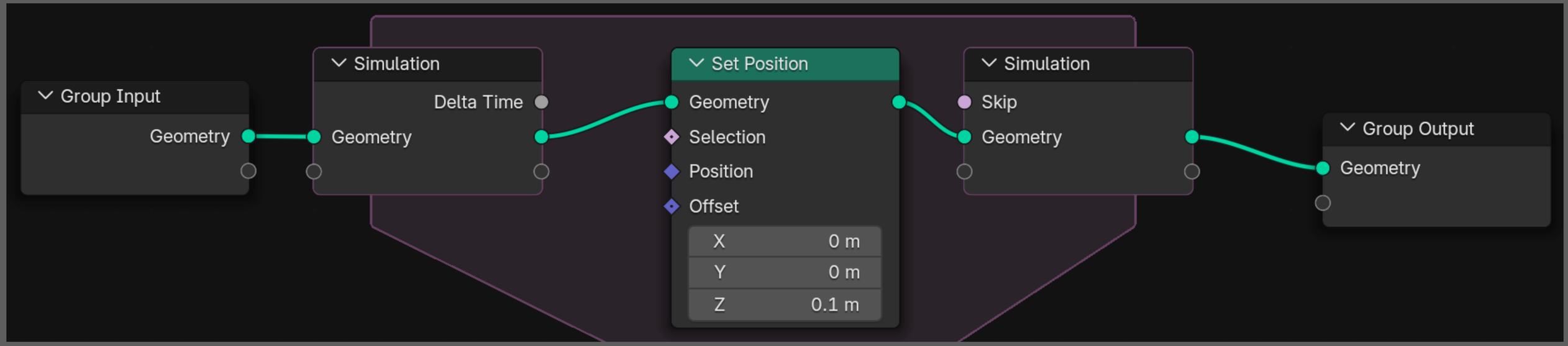




Frame 1

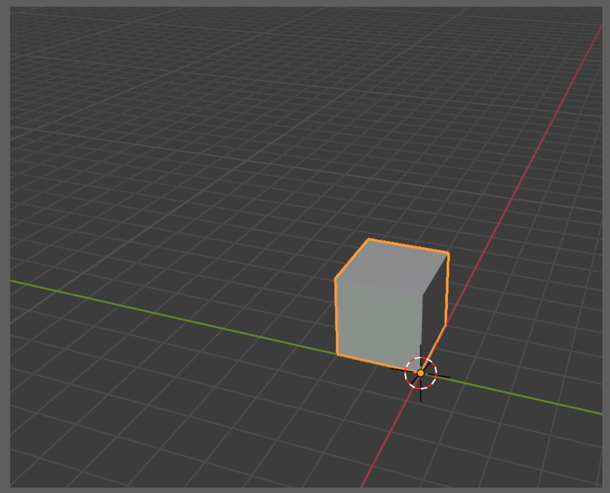


Frame 19

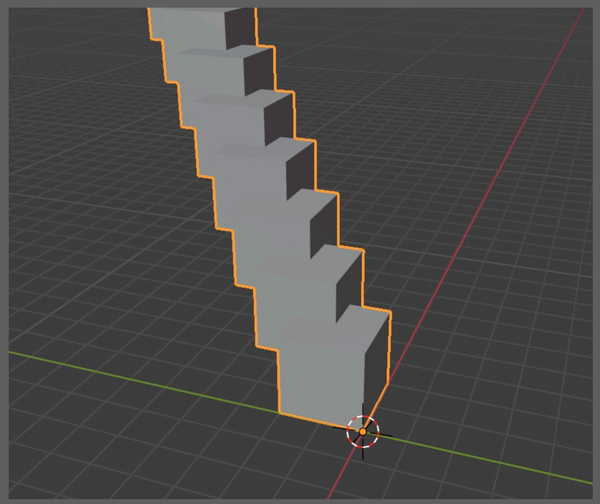


Procedural Shapes

Simulation Zone



Frame 1



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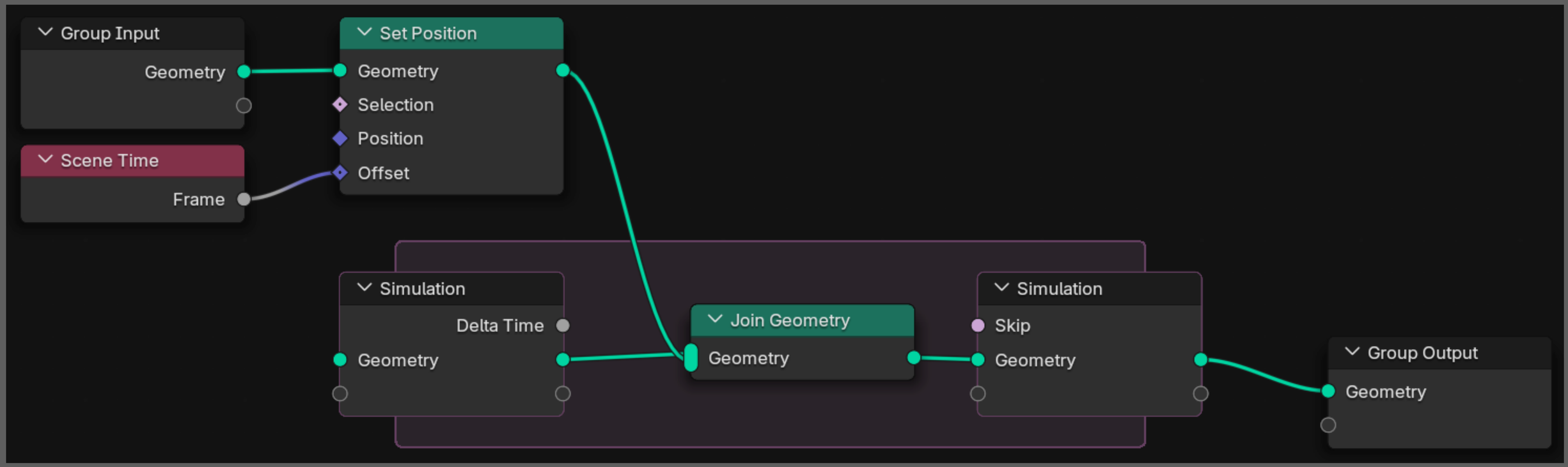
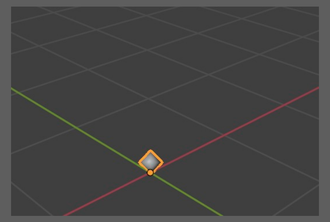


Procedural Shapes

Particle Emitter



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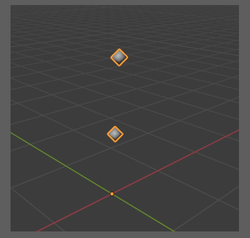

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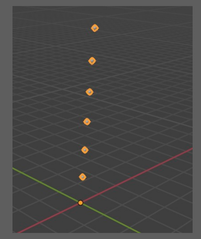

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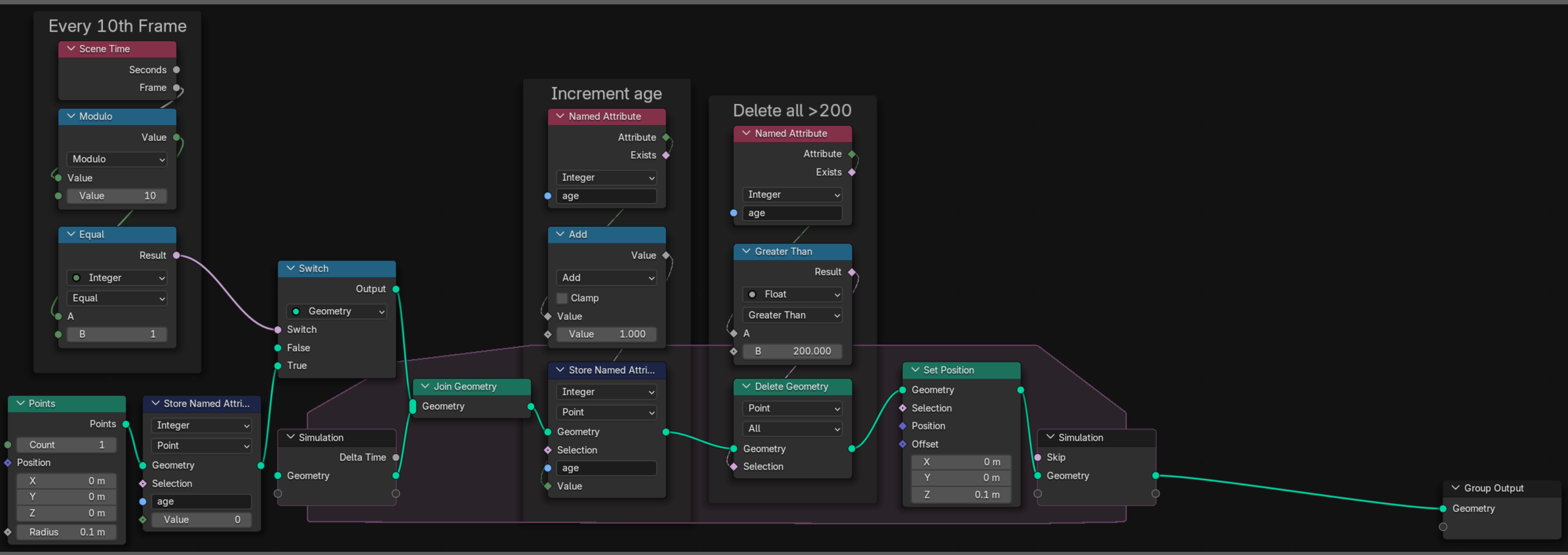
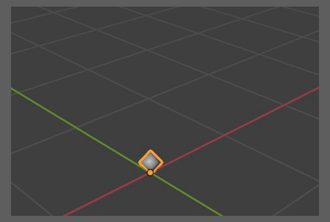


Procedural Shapes

Particle Emitter



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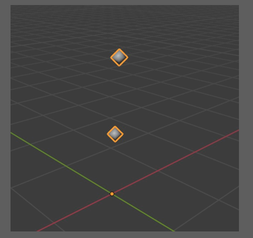

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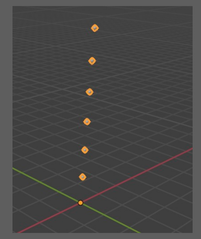

Frame 60

	position			radius	age
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	position			radius	age
0	0.000	0.000	0.800	0.100	8
1	0.000	0.000	1.800	0.100	18

	position			radius	age
0	0.000	0.000	1.000	0.100	10
1	0.000	0.000	2.000	0.100	20
2	0.000	0.000	3.000	0.100	30
3	0.000	0.000	4.000	0.100	40
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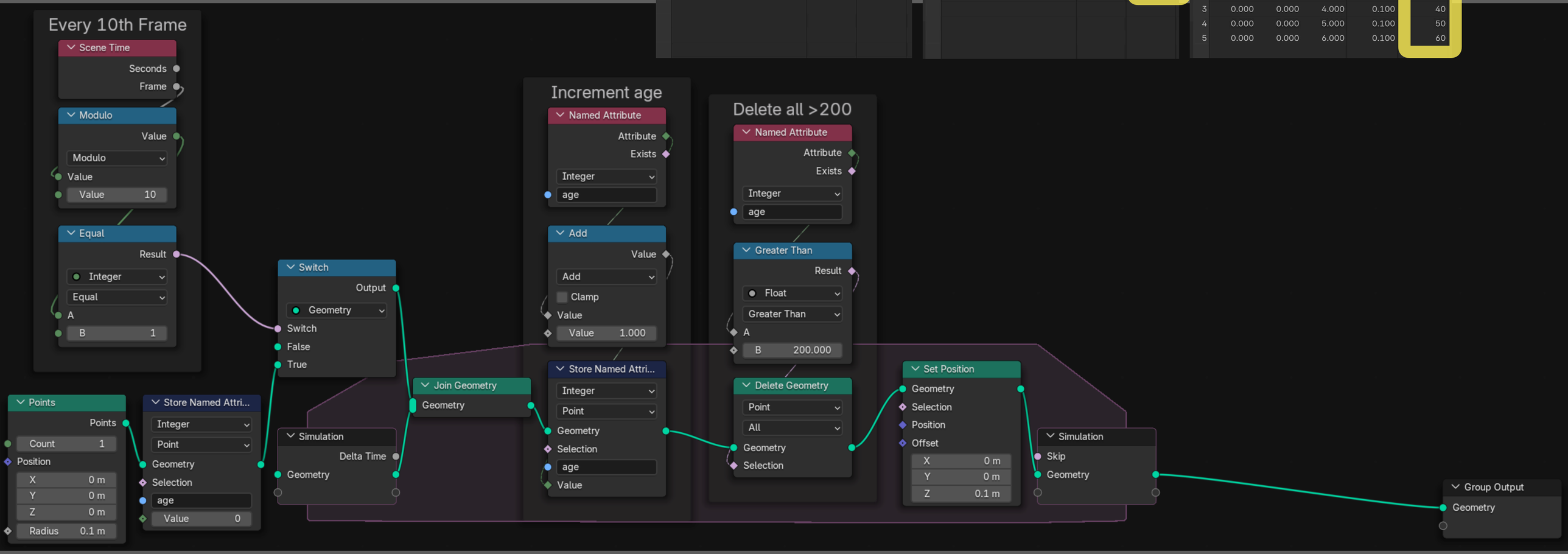
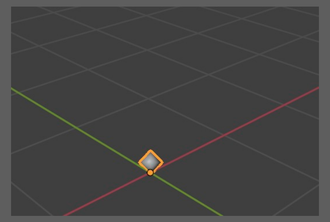
5	0.000	0.000	6.000	0.100	60



Procedural Shapes

Particle Emitter



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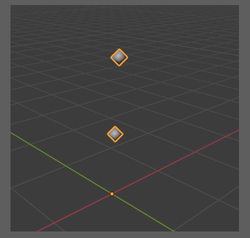

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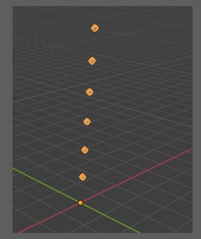

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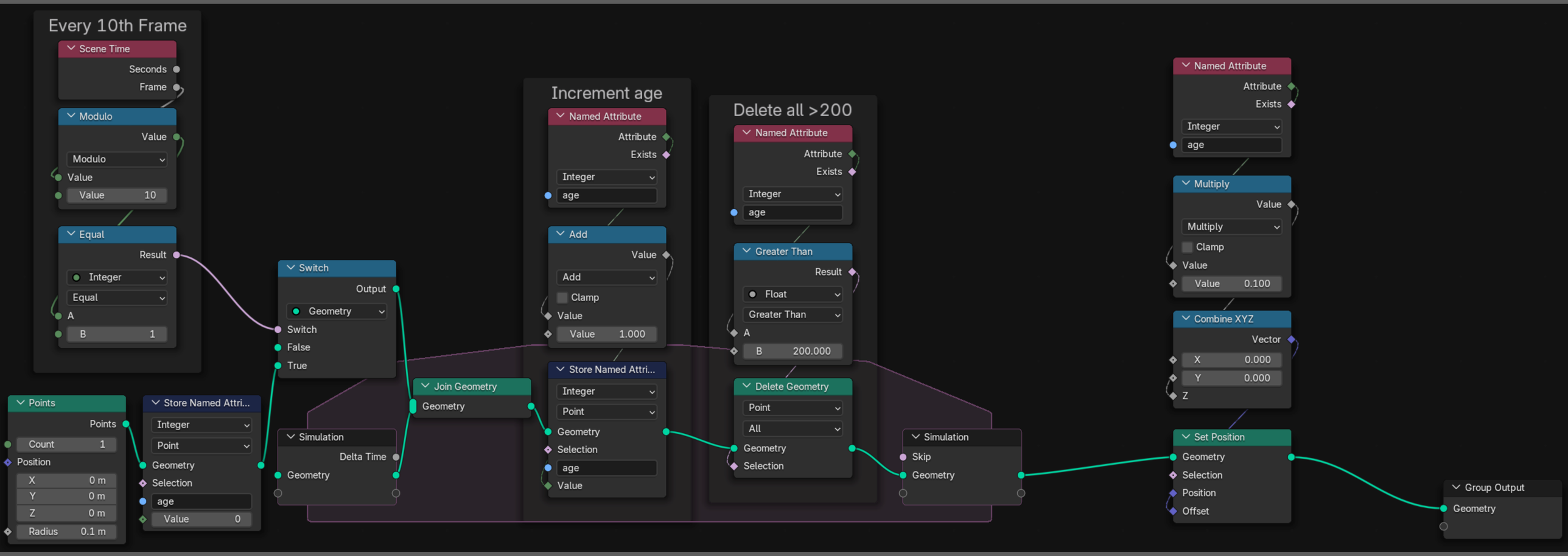
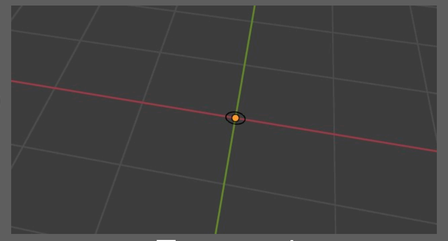


Procedural Shapes

Particle Emitter



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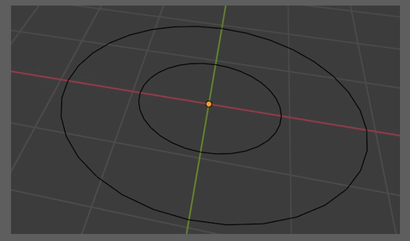

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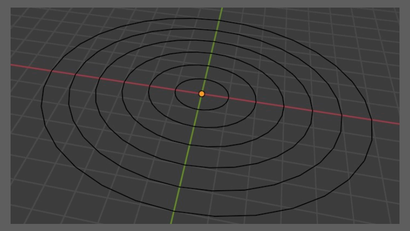

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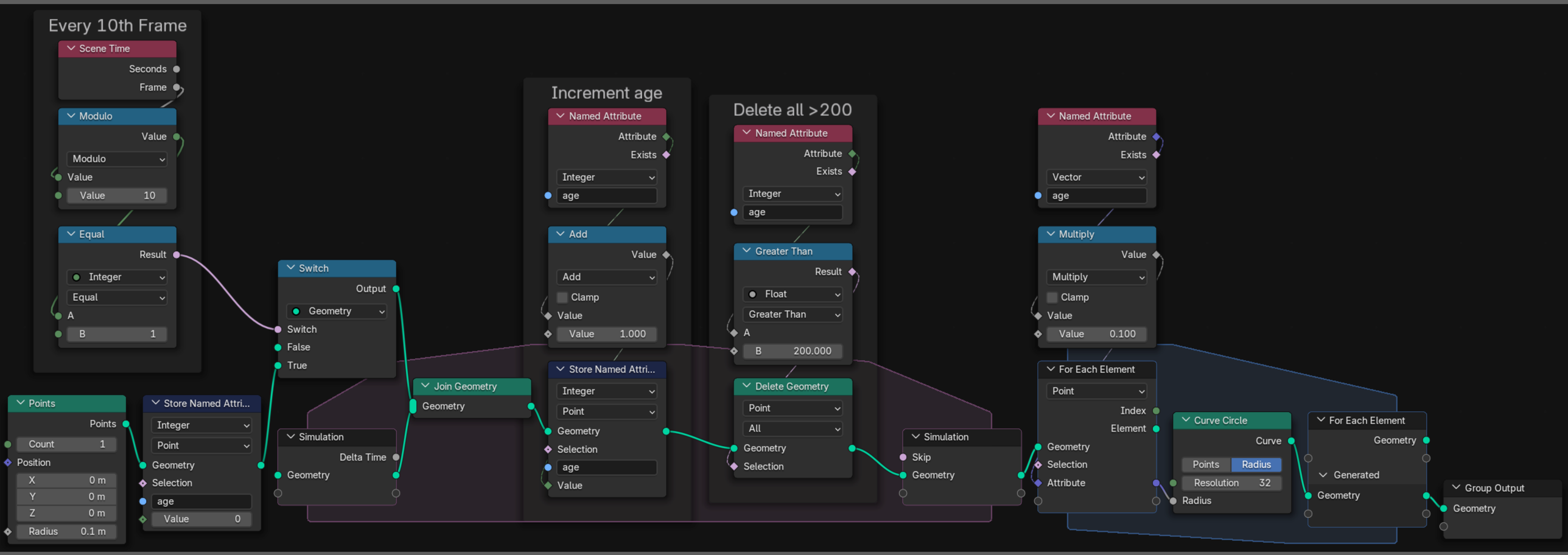
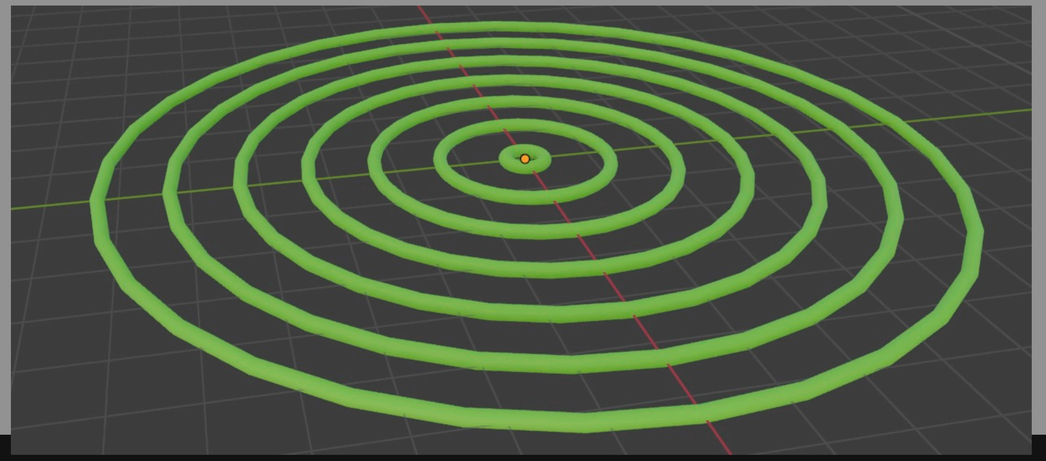
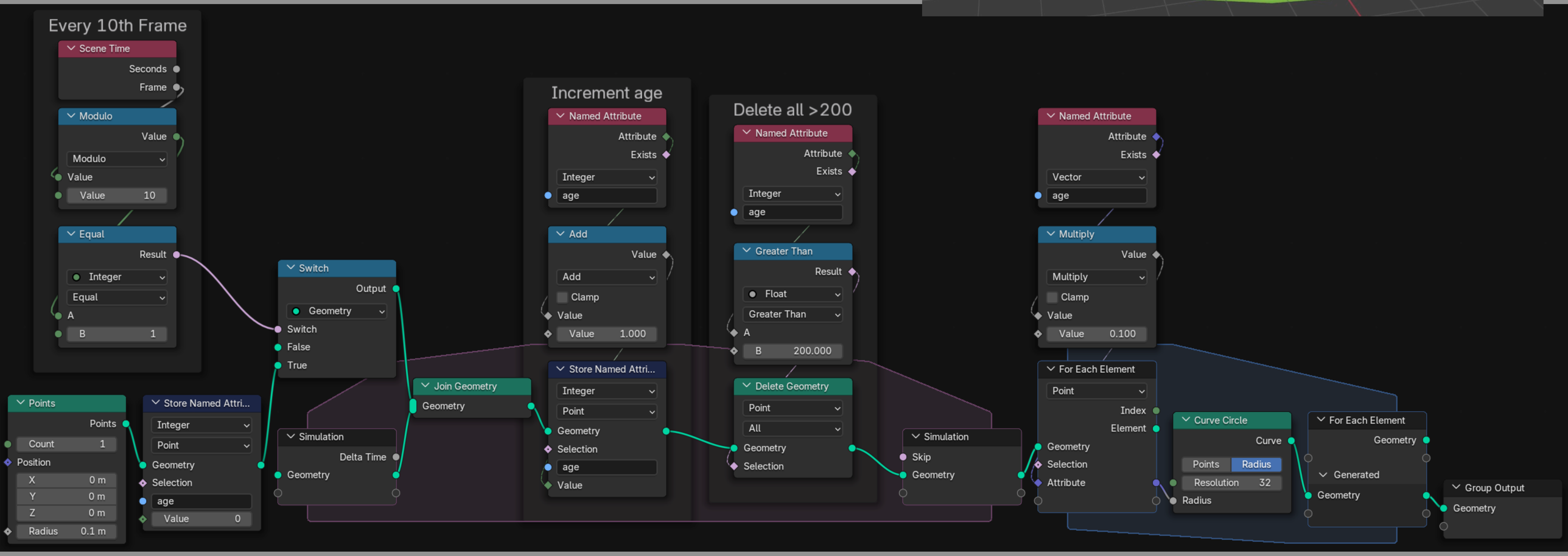


Procedural Shapes

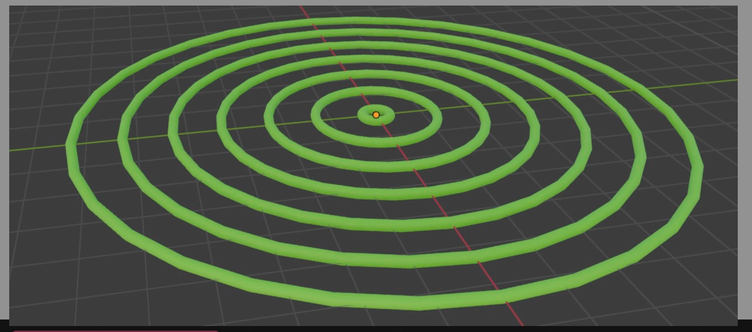
Task: Build your own wave Emitter

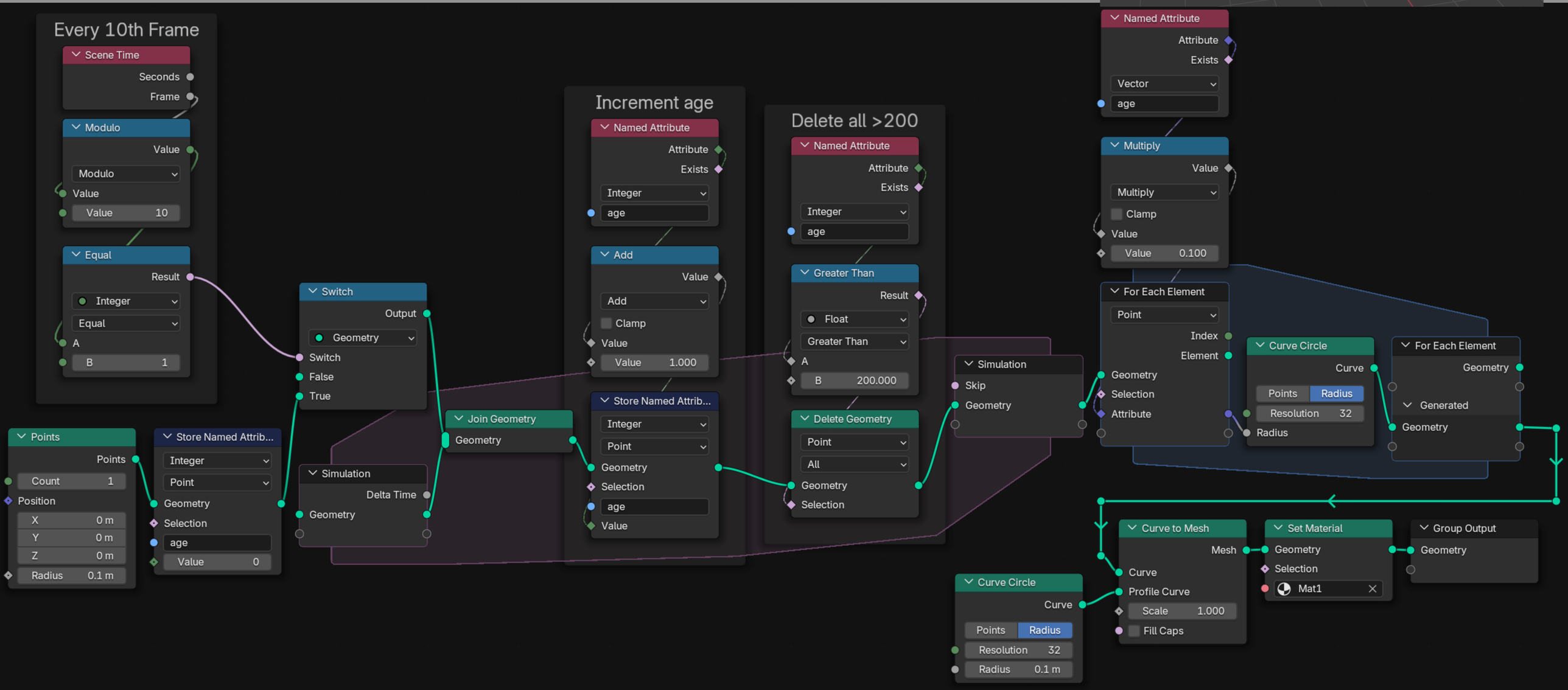




Procedural Shapes

Possible Solution





Further Resources - Geometry Nodes

https://www.youtube.com/watch?v=rGmMCpmL5vs

Harry Blends

Further Resources

Further Resources - Blender Science Discord

https://discord.gg/9GrqdVmHmR