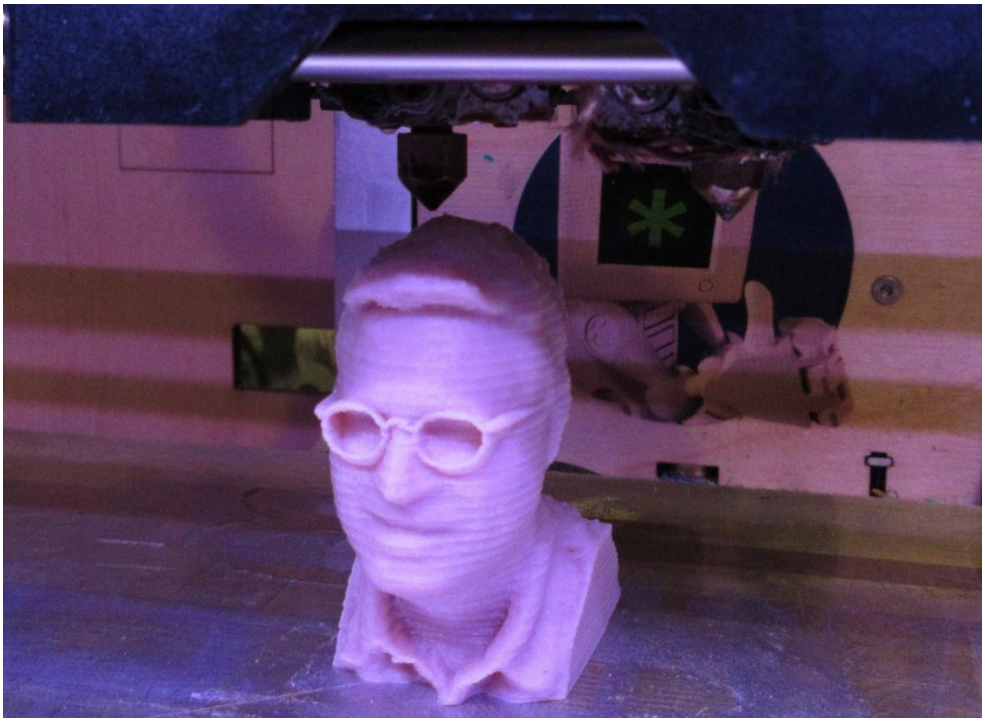
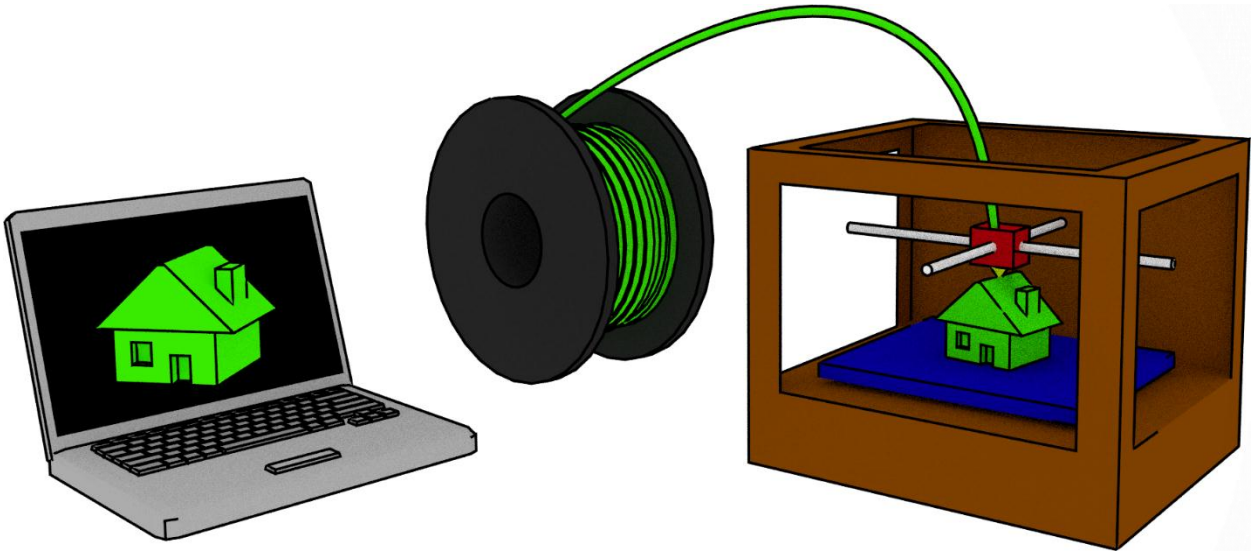
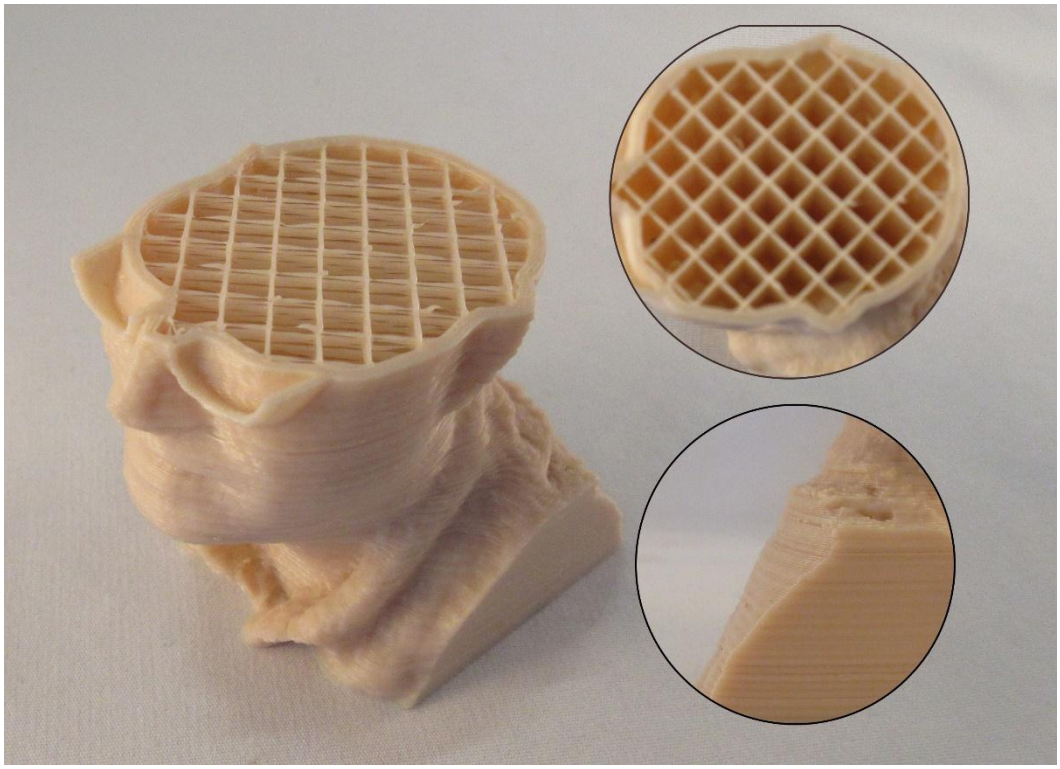
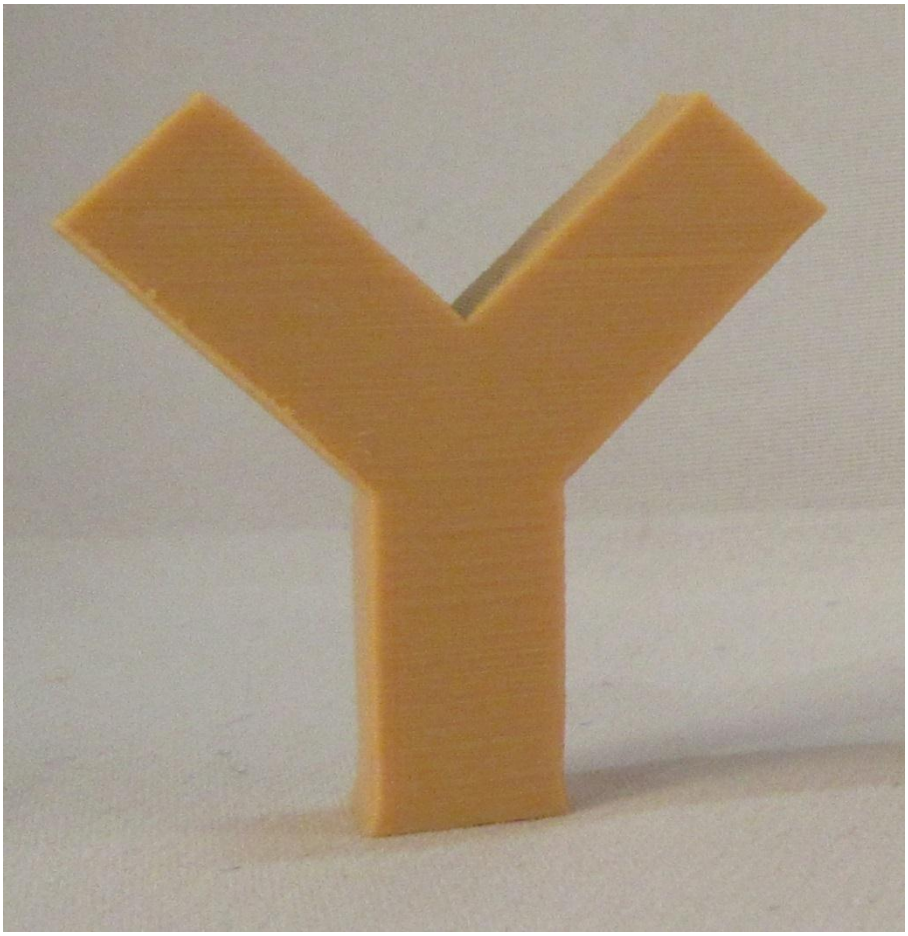
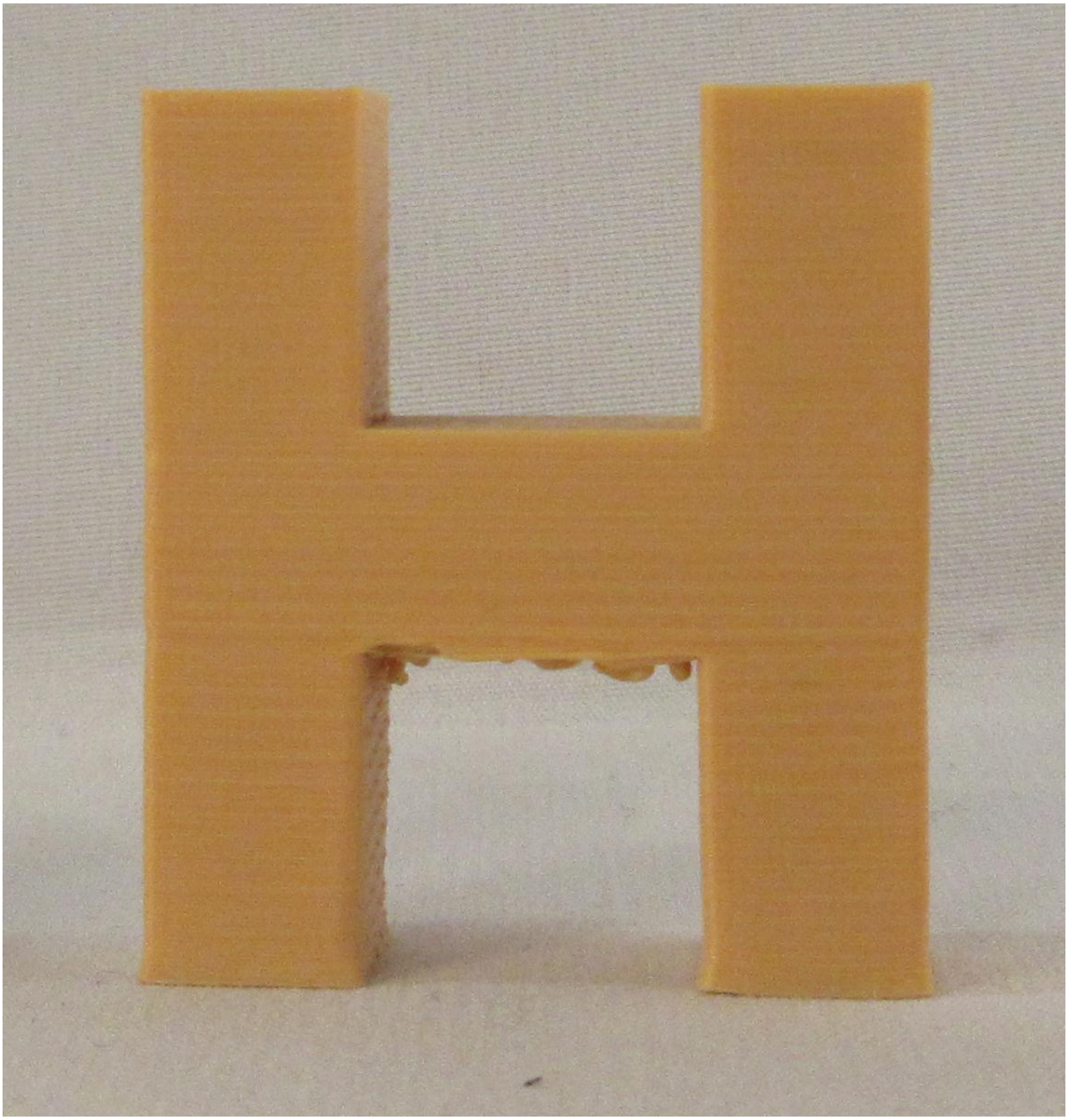
Chapter 1: 3D Printing Basics

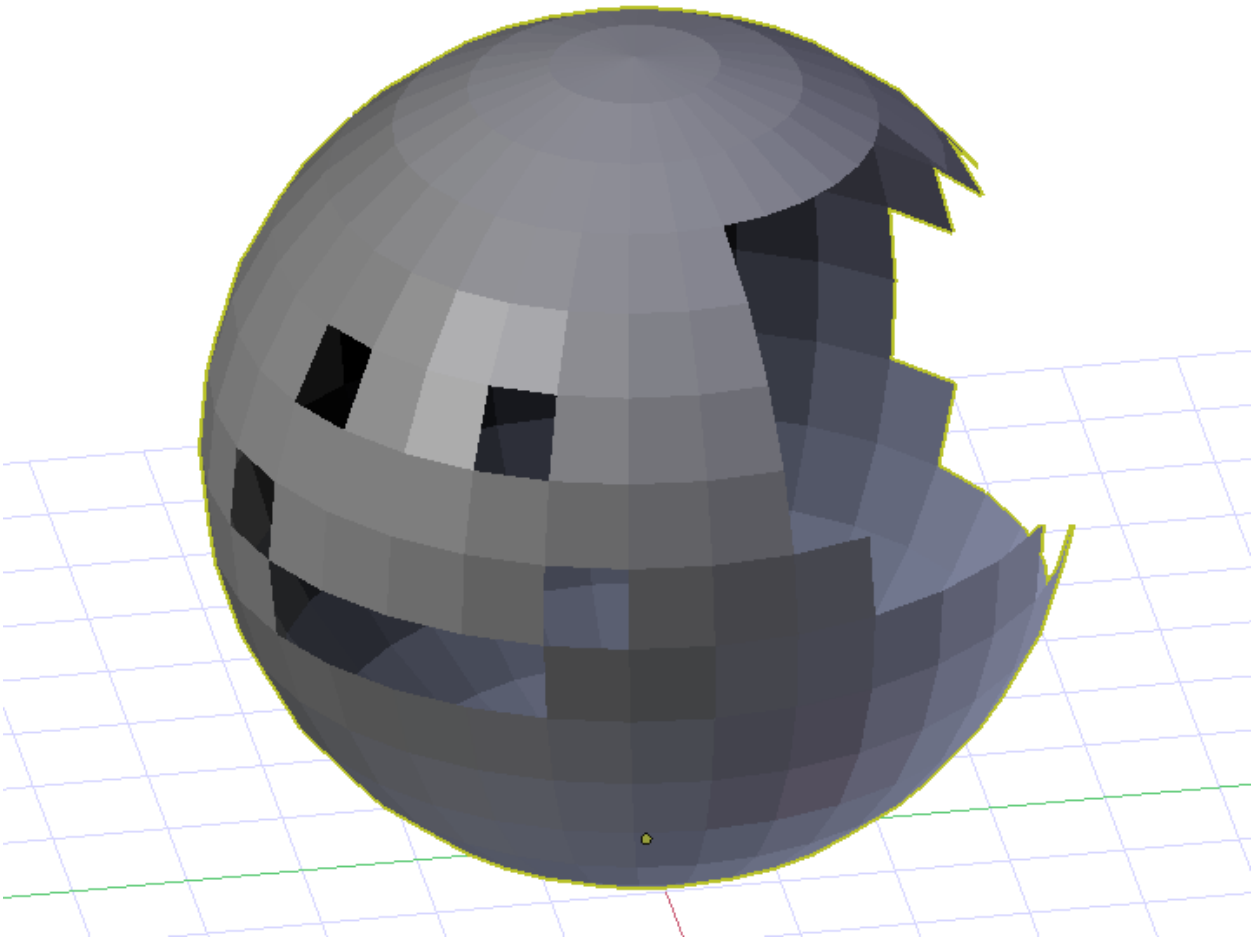


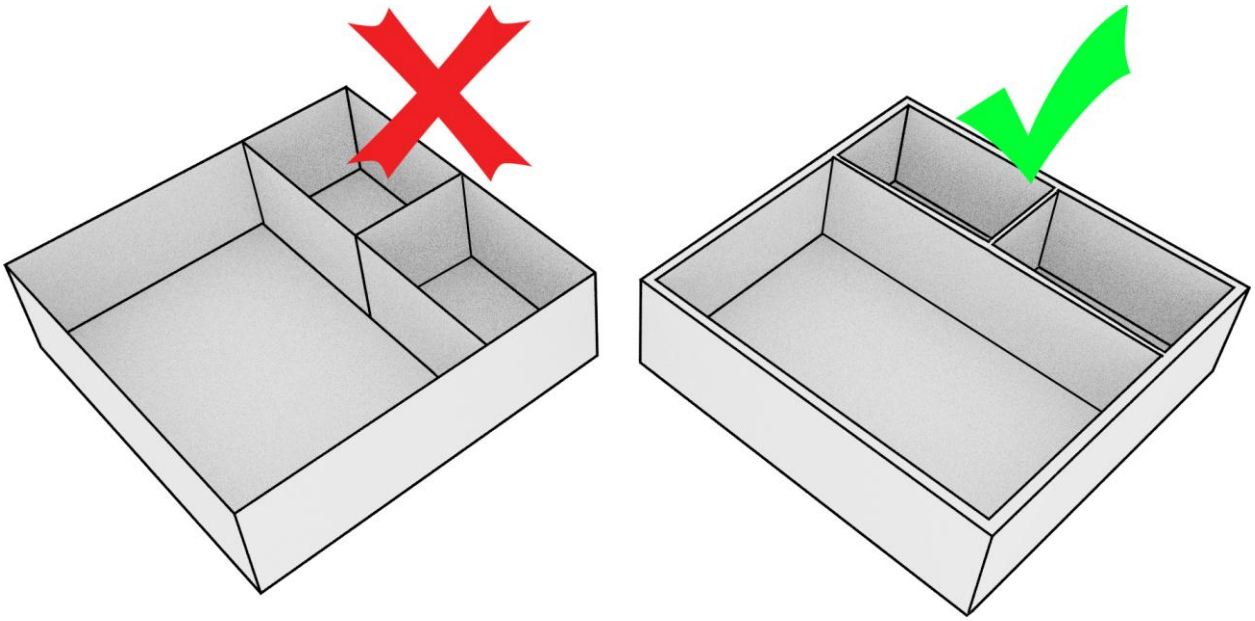




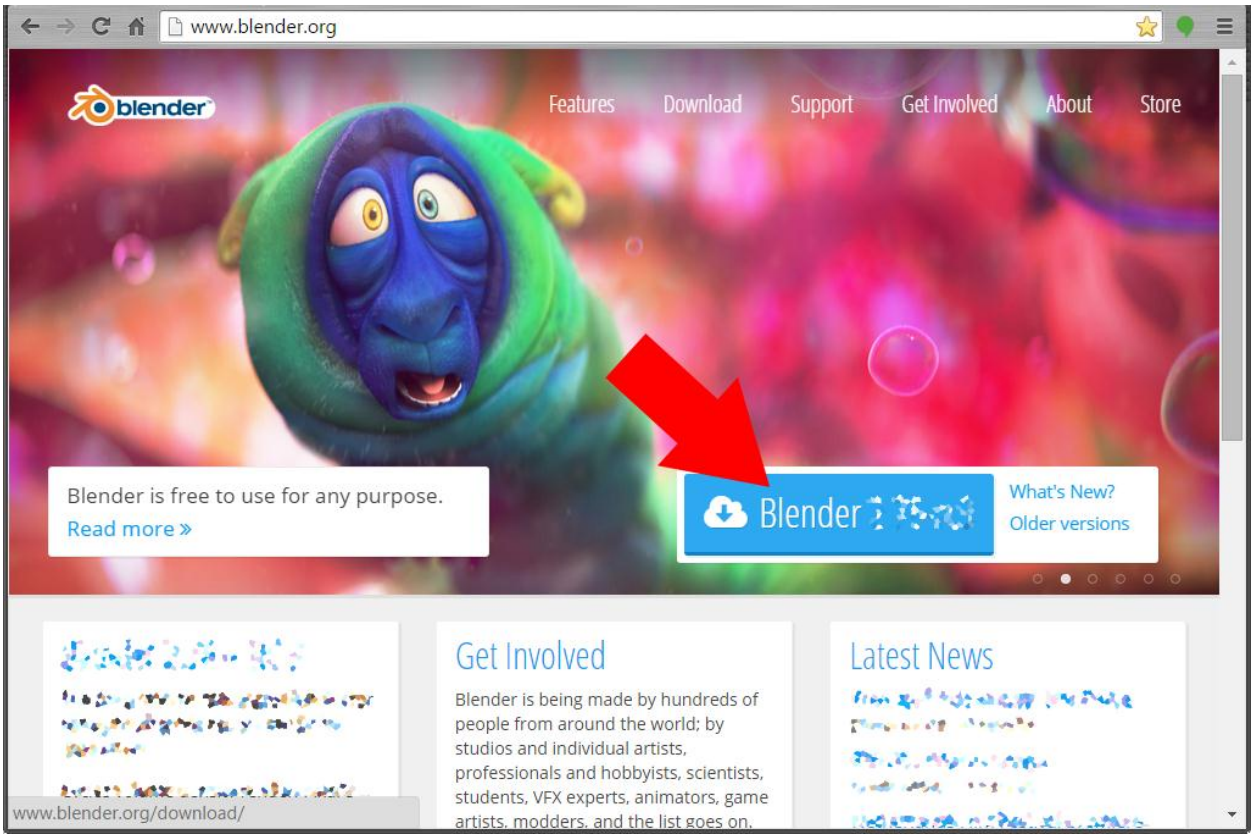


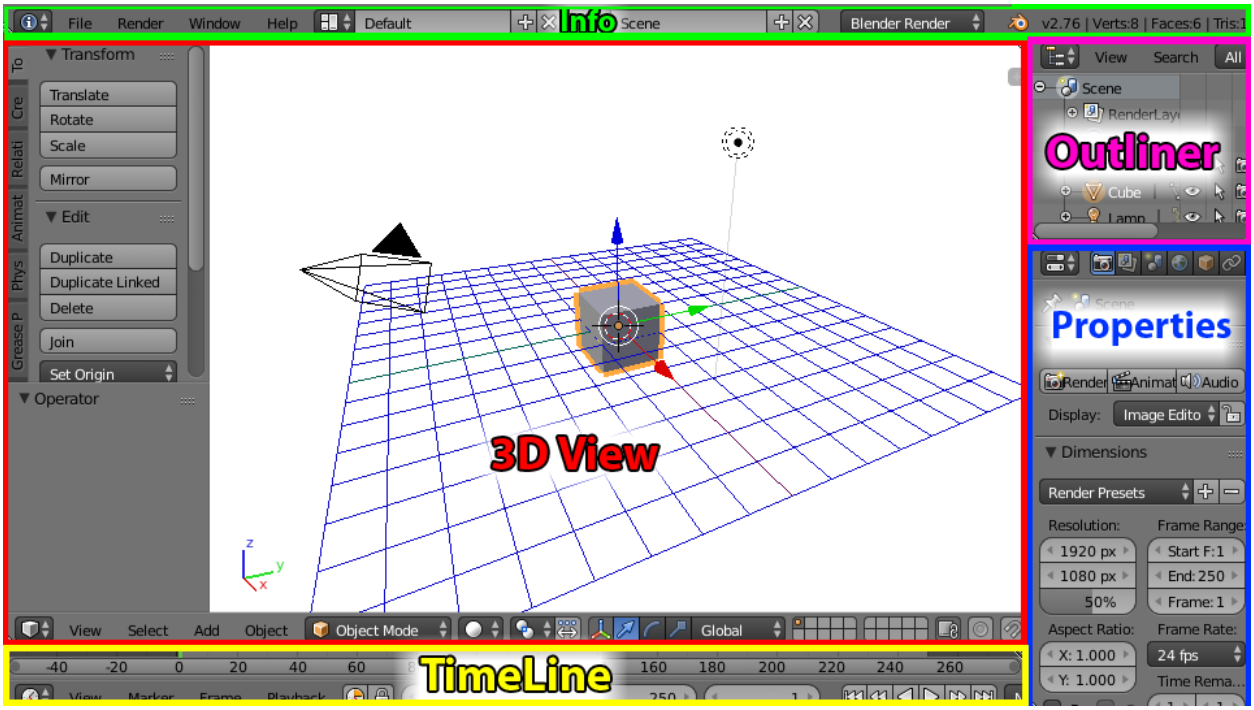


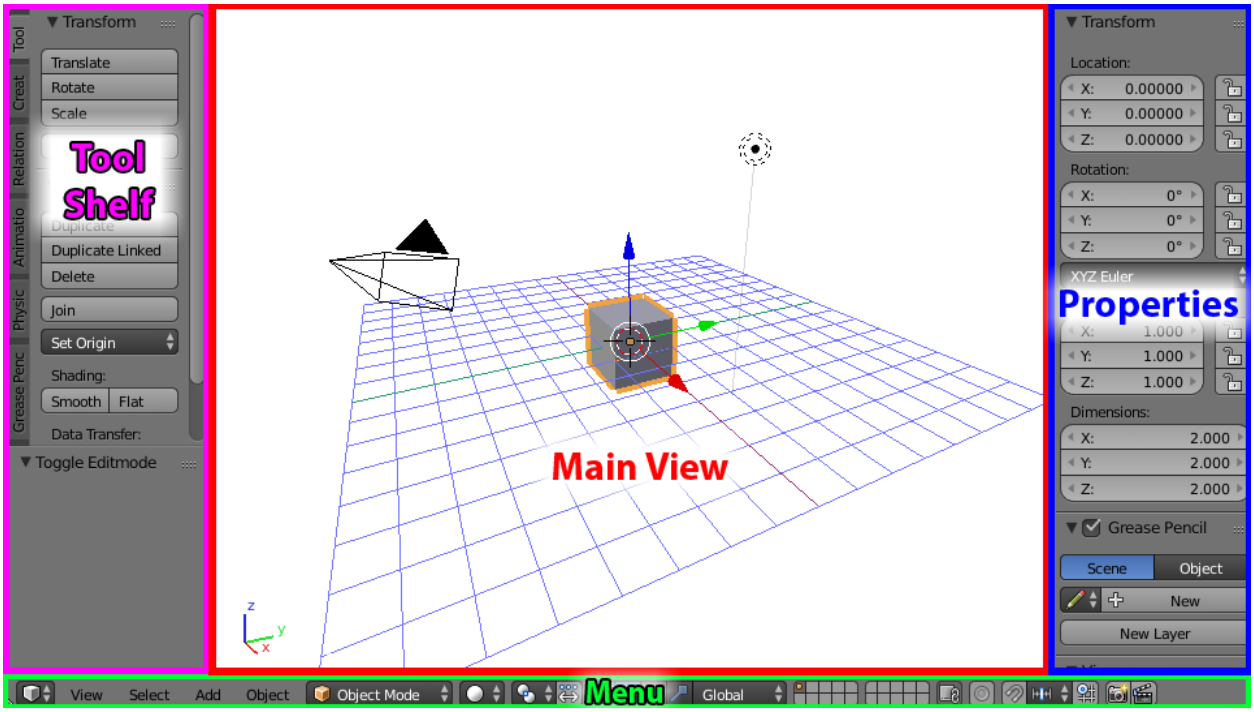


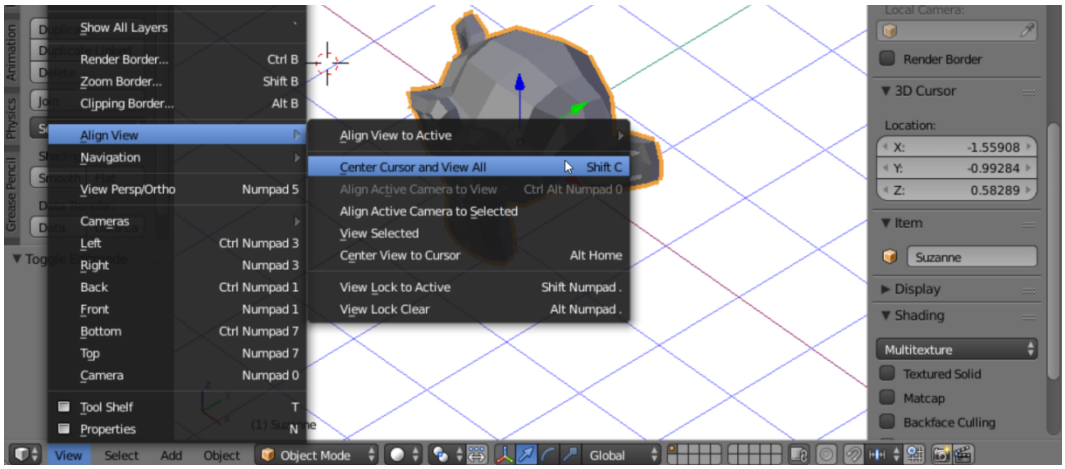


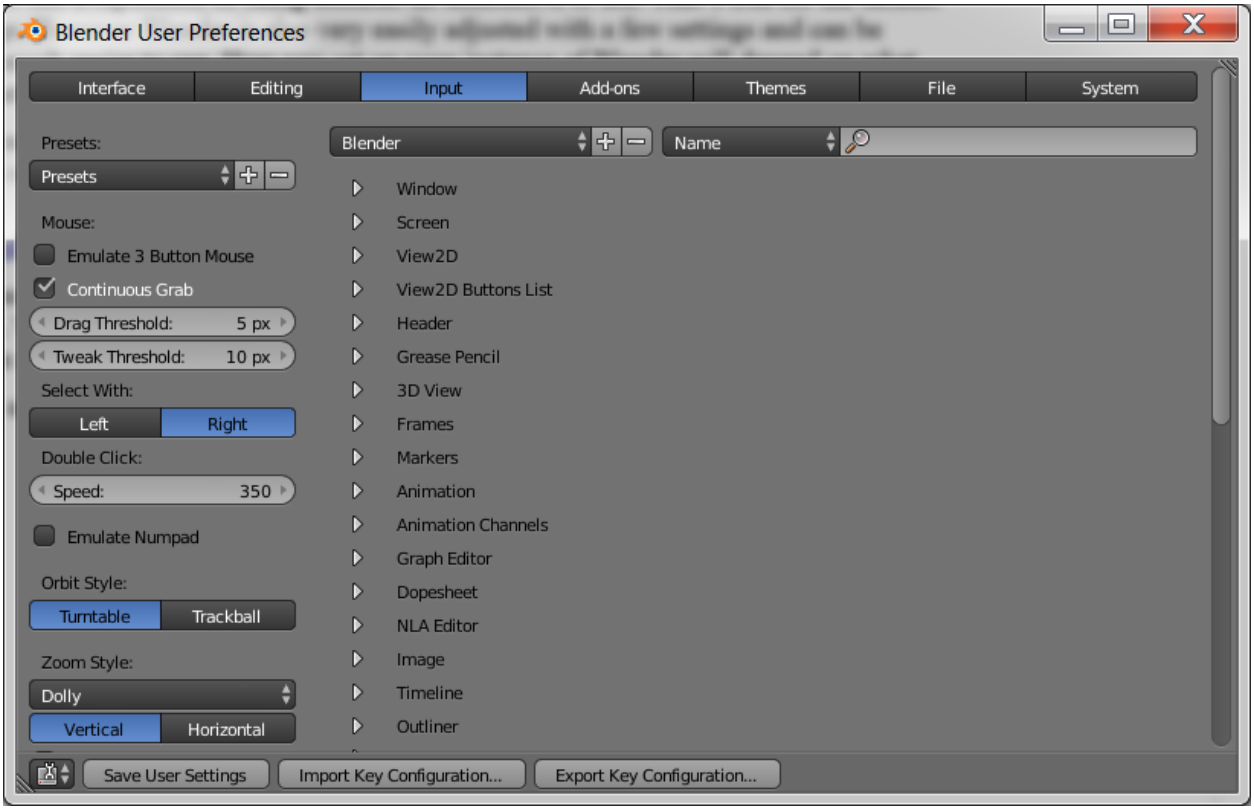
Chapter 2: Beginning Blender

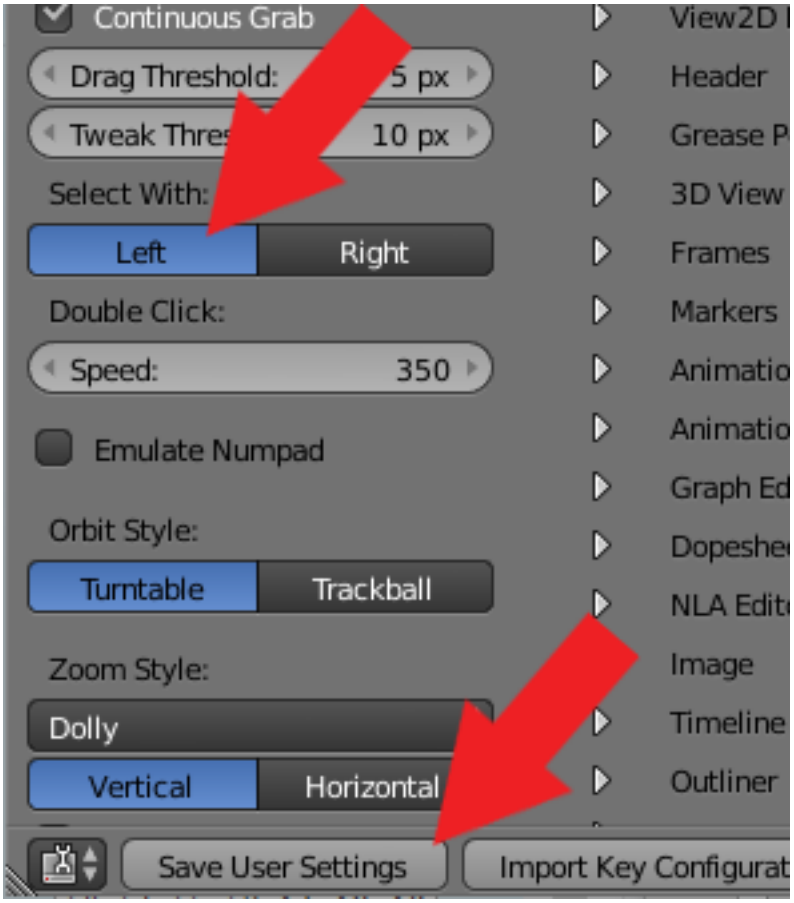


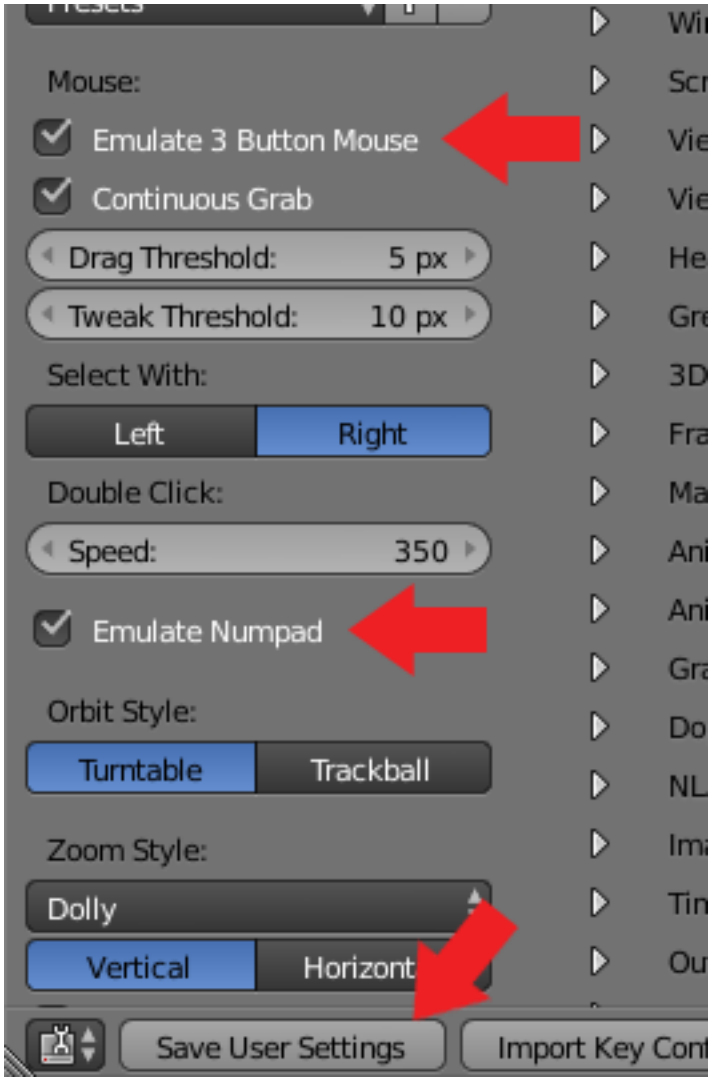


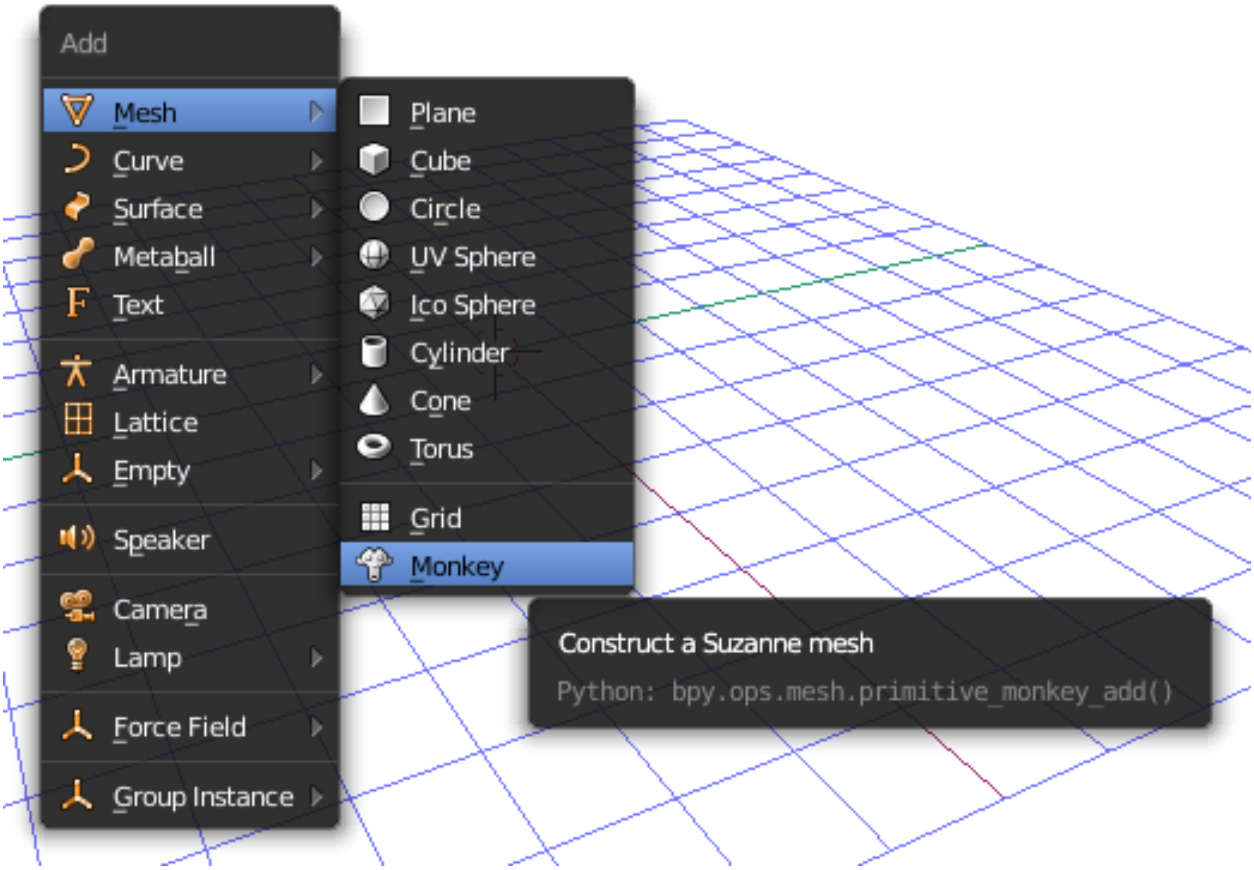

Tool
Creat
Relation
Animatio
Physic
Grease Penc
Transform
Translate
Rotate
Scale
Tool Shelf
Duplicate
Duplicate Linked
Delete
Join
Set Origin
Shading:
Smooth
Flat
Data Transfer:
Toggle Editmode
Main View
Transform
Location:
X: 0.00000
Y: 0.00000
Z: 0.00000
Rotation:
X: 0°
Y: 0°
Z: 0°
XYZ Euler
Properties
X: 1.000
Y: 1.000
Z: 1.000
Dimensions:
X: 2.000
Y: 2.000
Z: 2.000
Grease Pencil
Scene
Object
New
New Layer
View
Select
Add
Object
Object Mode
Menu
Global

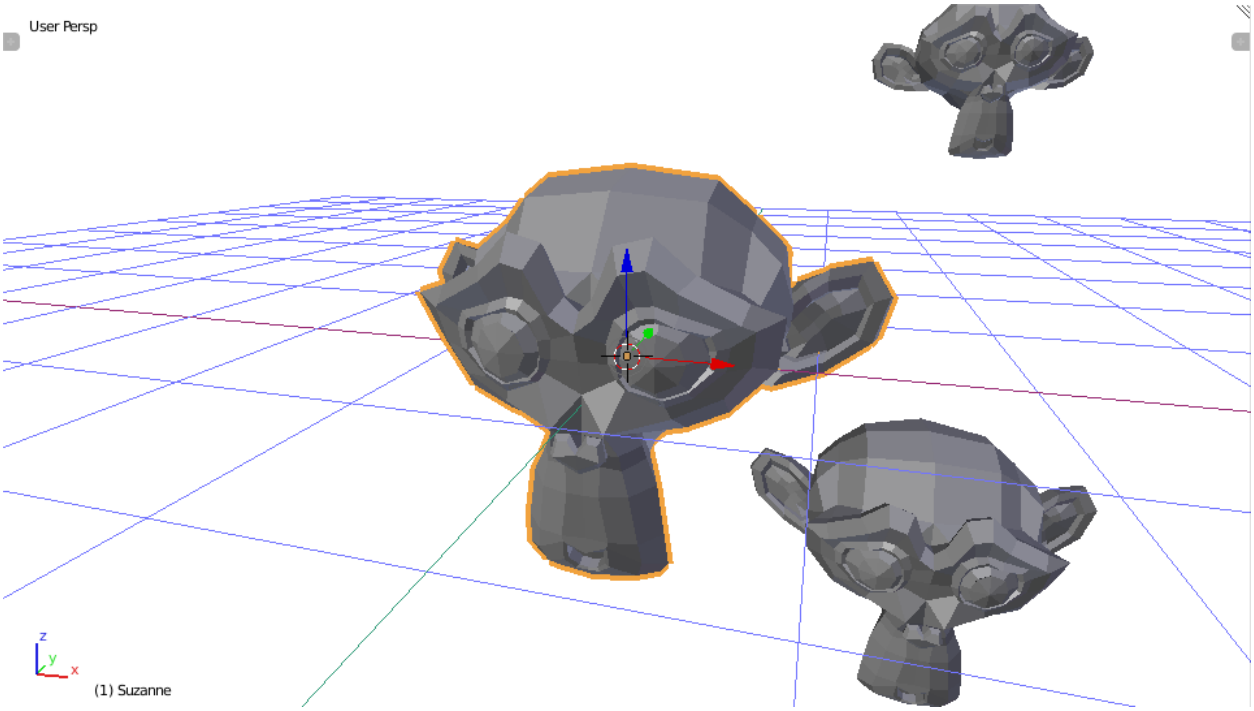

Show All Layers
Render Border... Ctrl B
Zoom Border... Shift B
Clipping Border... Alt B
Align View
Navigation
View Persp/Ortho Numpad 5
Cameras
Left Ctrl Numpad 3
Right Numpad 3
Back Ctrl Numpad 1
Front Numpad 1
Bottom Ctrl Numpad 7
Top Numpad 7
Camera Numpad 0
Tool Shelf T
Properties N
Align View to Active
Center Cursor and View All Shift C
Align Active Camera to View Ctrl Alt Numpad 0
Align Active Camera to Selected
View Selected
Center View to Cursor Alt Home
View Lock to Active Shift Numpad .
View Lock Clear Alt Numpad .
Render Border
3D Cursor
Location:
X: -1.55908
Y: -0.99284
Z: 0.58289
Item
Suzanne
Display
Shading
Multitexture
Textured Solid
Matcap
Backface Culling
View
Select
Add
Object
Object Mode
Global

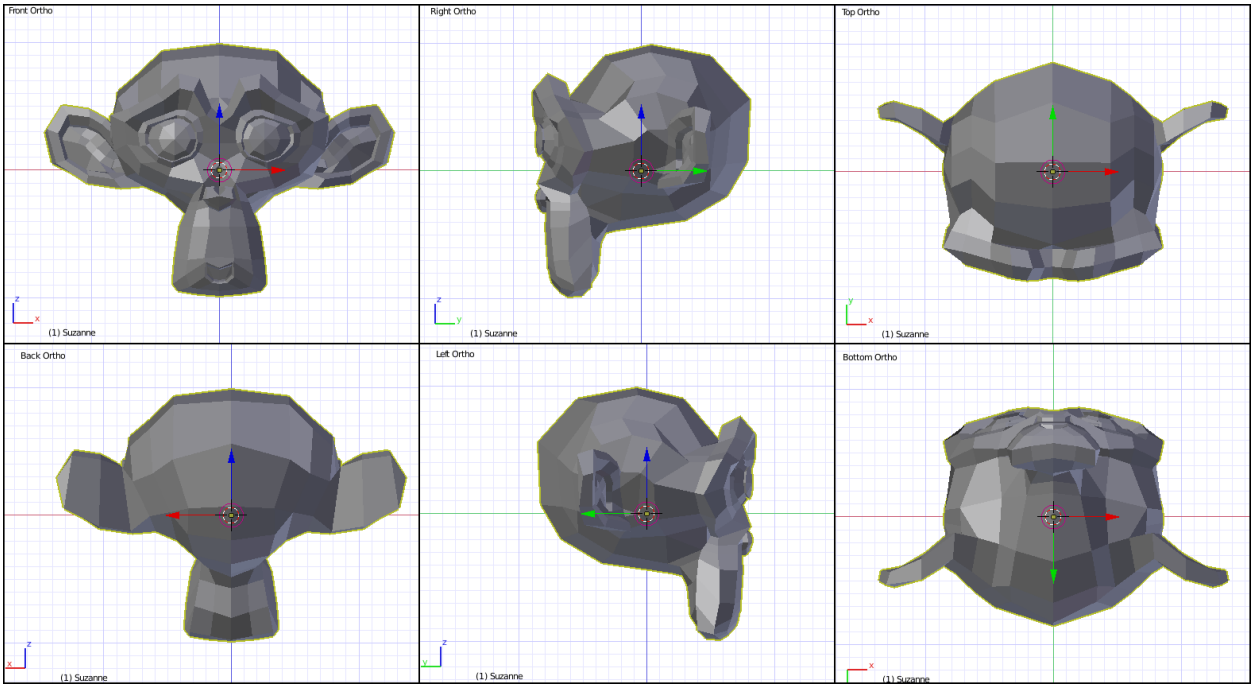

Blender User Preferences
Interface
Editing
Input
Add-ons
Themes
File
System
Presets:
Presets
Mouse:
Emulate 3 Button Mouse
Continuous Grab
Drag Threshold: 5 px
Tweak Threshold: 10 px
Select With:
Left
Right
Double Click:
Speed: 350
Emulate Numpad
Orbit Style:
Turntable
Trackball
Zoom Style:
Dolly
Vertical
Horizontal
Blender
Name
Window
Screen
View2D
View2D Buttons List
Header
Grease Pencil
3D View
Frames
Markers
Animation
Animation Channels
Graph Editor
Dopesheet
NLA Editor
Image
Timeline
Outliner
Save User Settings
Import Key Configuration...
Export Key Configuration...

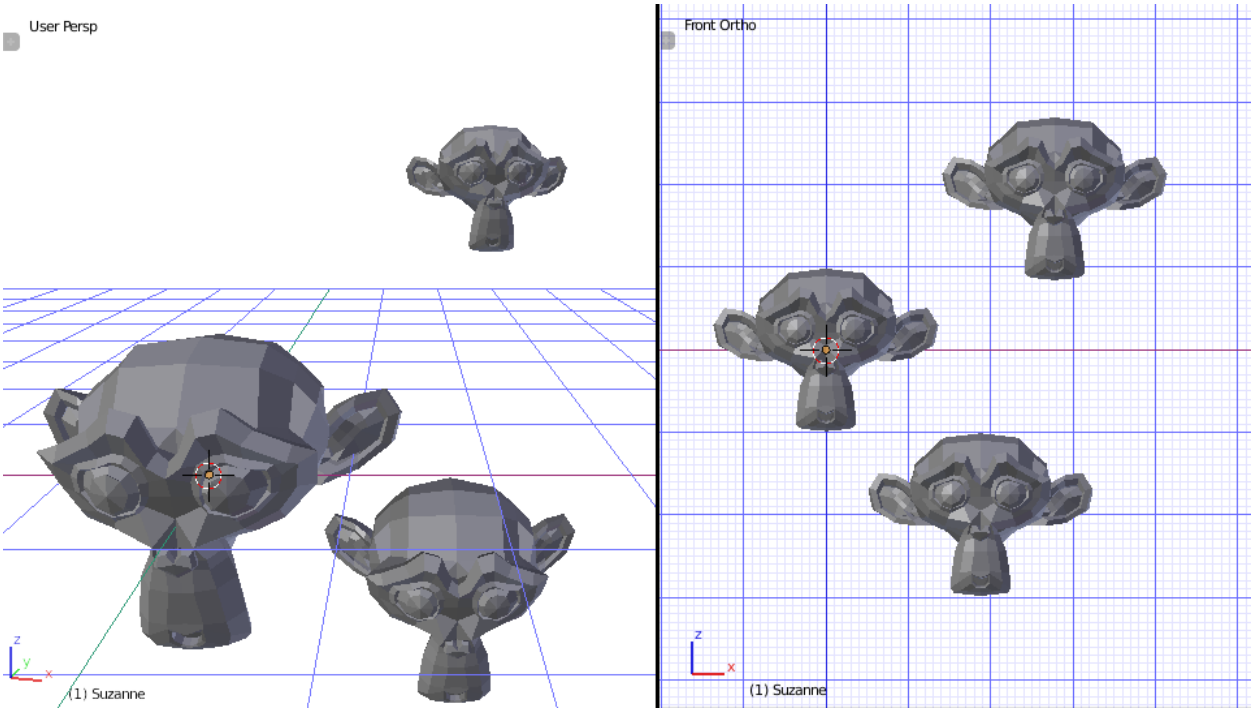

Continuous Grab
Drag Threshold:
5 px
Tweak Thres
10 px
Select With:
Left
Right
Double Click:
Speed:
350
Emulate Numpad
Orbit Style:
Turntable
Trackball
Zoom Style:
Dolly
Vertical
Horizontal
Save User Settings
Import Key Configurat
View2D
Header
Grease P
3D View
Frames
Markers
Animatio
Animatio
Graph Ed
Dopeshe
NLA Edit
Image
Timeline
Outliner

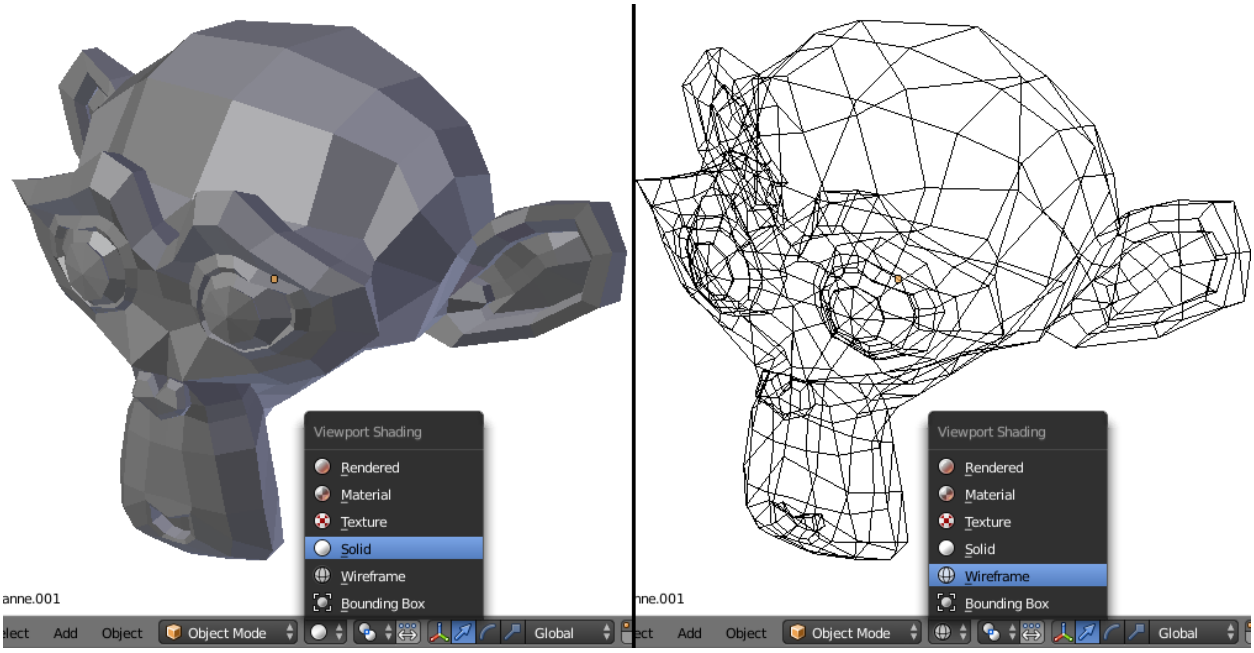

Mouse:
Emulate 3 Button Mouse
Continuous Grab
Drag Threshold: 5 px
Tweak Threshold: 10 px
Select With:
Left
Right
Double Click:
Speed: 350
Emulate Numpad
Orbit Style:
Turntable
Trackball
Zoom Style:
Dolly
Vertical
Save User Settings

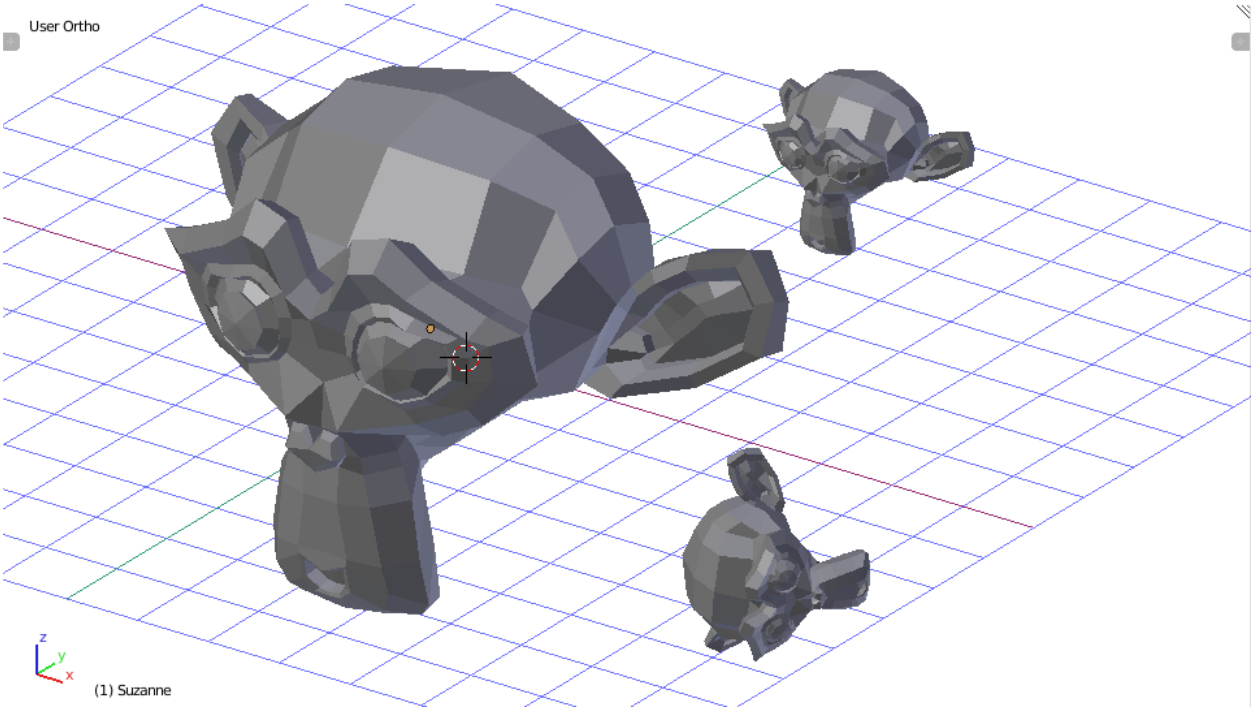

Add
Mesh
Curve
Surface
Metaball
Text
Armature
Lattice
Empty
Speaker
Camera
Lamp
Force Field
Group Instance
Plane
Cube
Circle
UV Sphere
Ico Sphere
Cylinder
Cone
Torus
Grid
Monkey
Construct a Suzanne mesh
Python: bpy.ops.mesh.primitive_monkey_add()


User Persp
(1) Suzanne

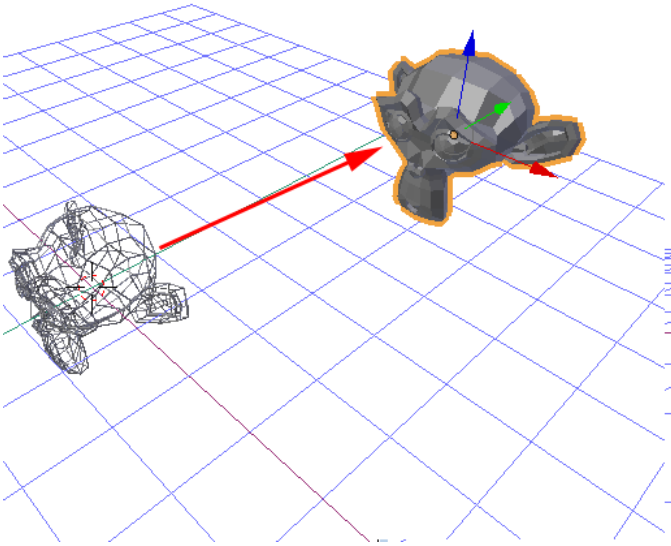

Front Ortho
(1) Suzanne
Right Ortho
(1) Suzanne
Top Ortho
(1) Suzanne
Back Ortho
(1) Suzanne
Left Ortho
(1) Suzanne
Bottom Ortho
(1) Suzanne

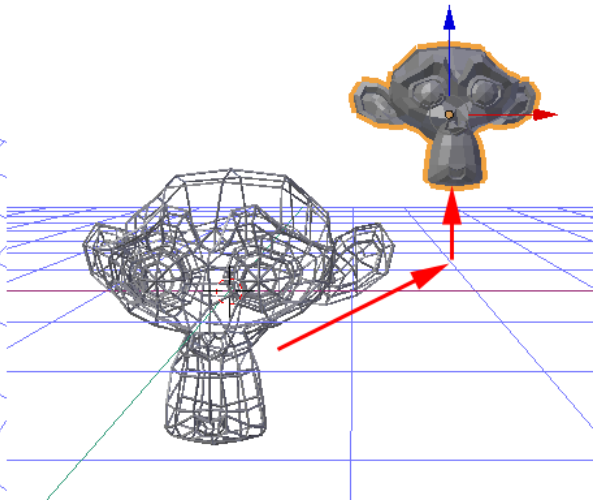

User Persp
(1) Suzanne
Front Ortho
(1) Suzanne

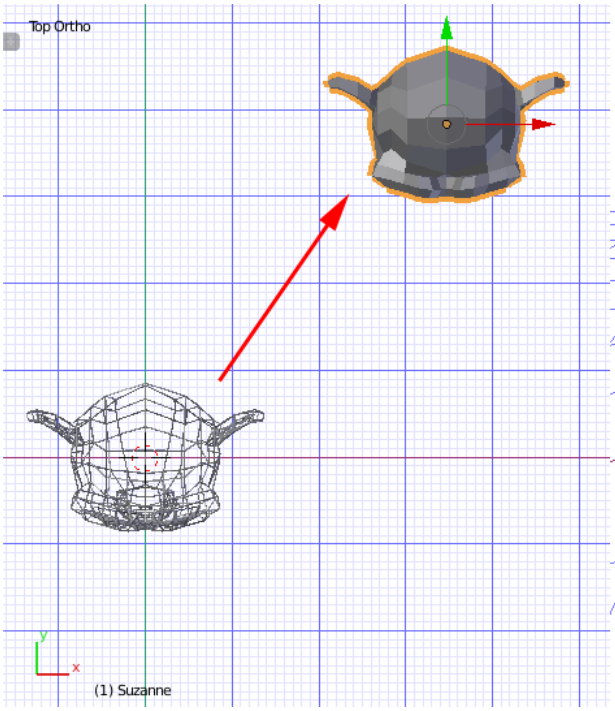

Viewport Shading
Rendered
Material
Texture
Solid
Wireframe
Bounding Box
Add
Object
Object Mode
Global
Viewport Shading
Rendered
Material
Texture
Solid
Wireframe
Bounding Box
Add
Object
Object Mode
Global

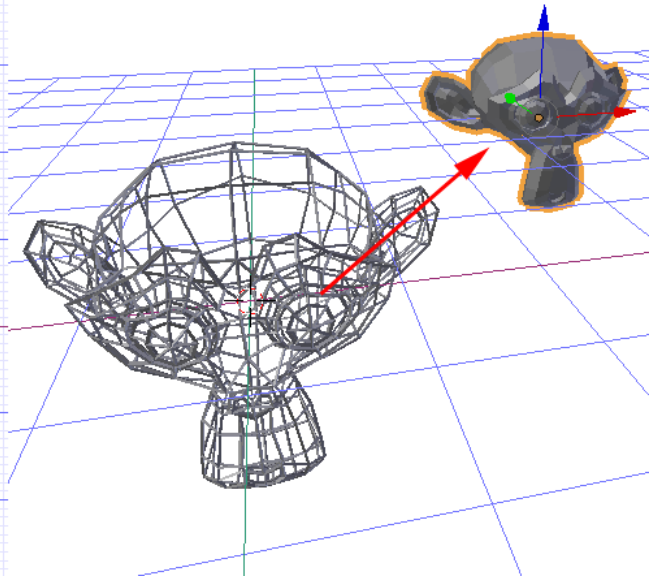

User Ortho
(1) Suzanne

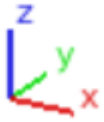
Without control

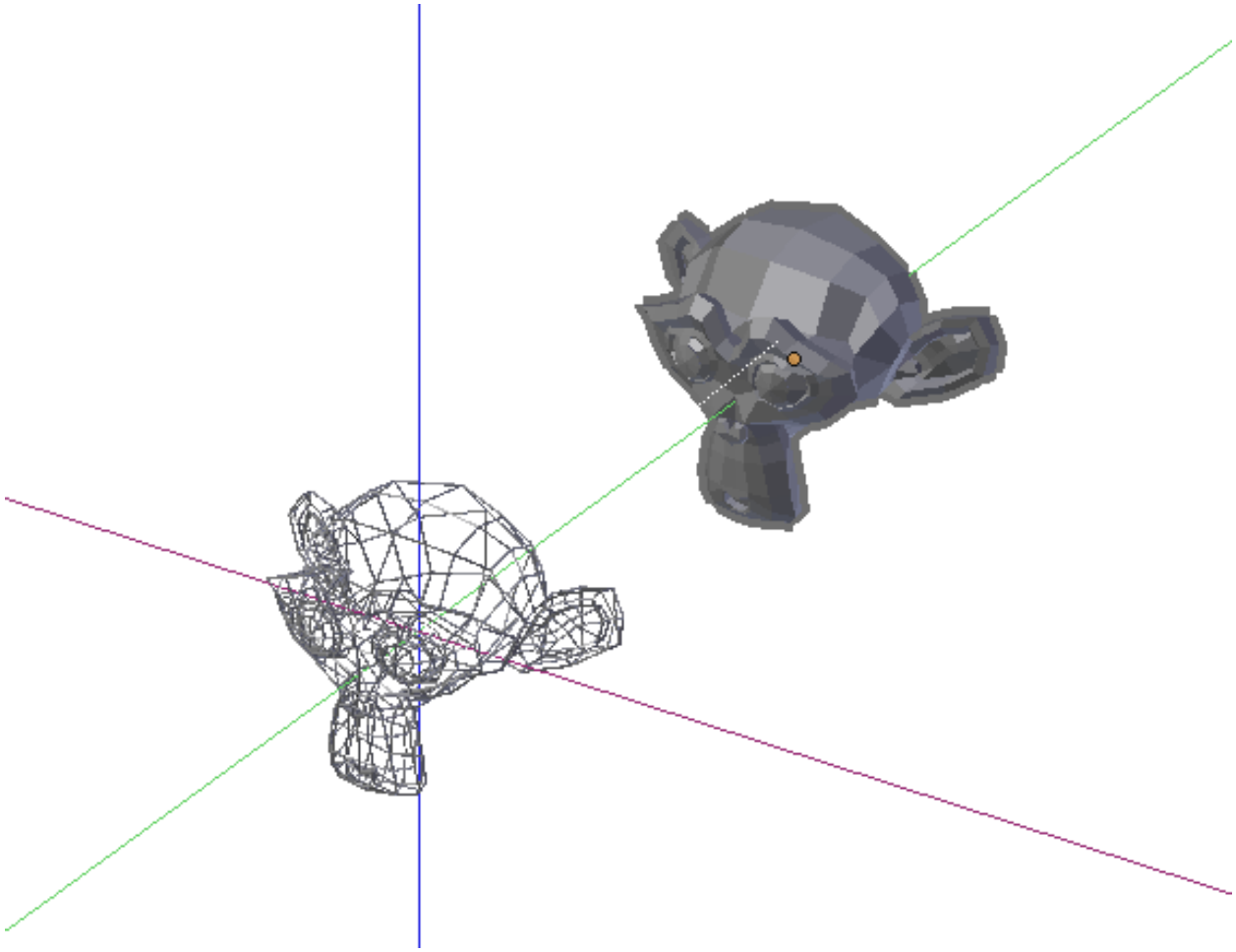


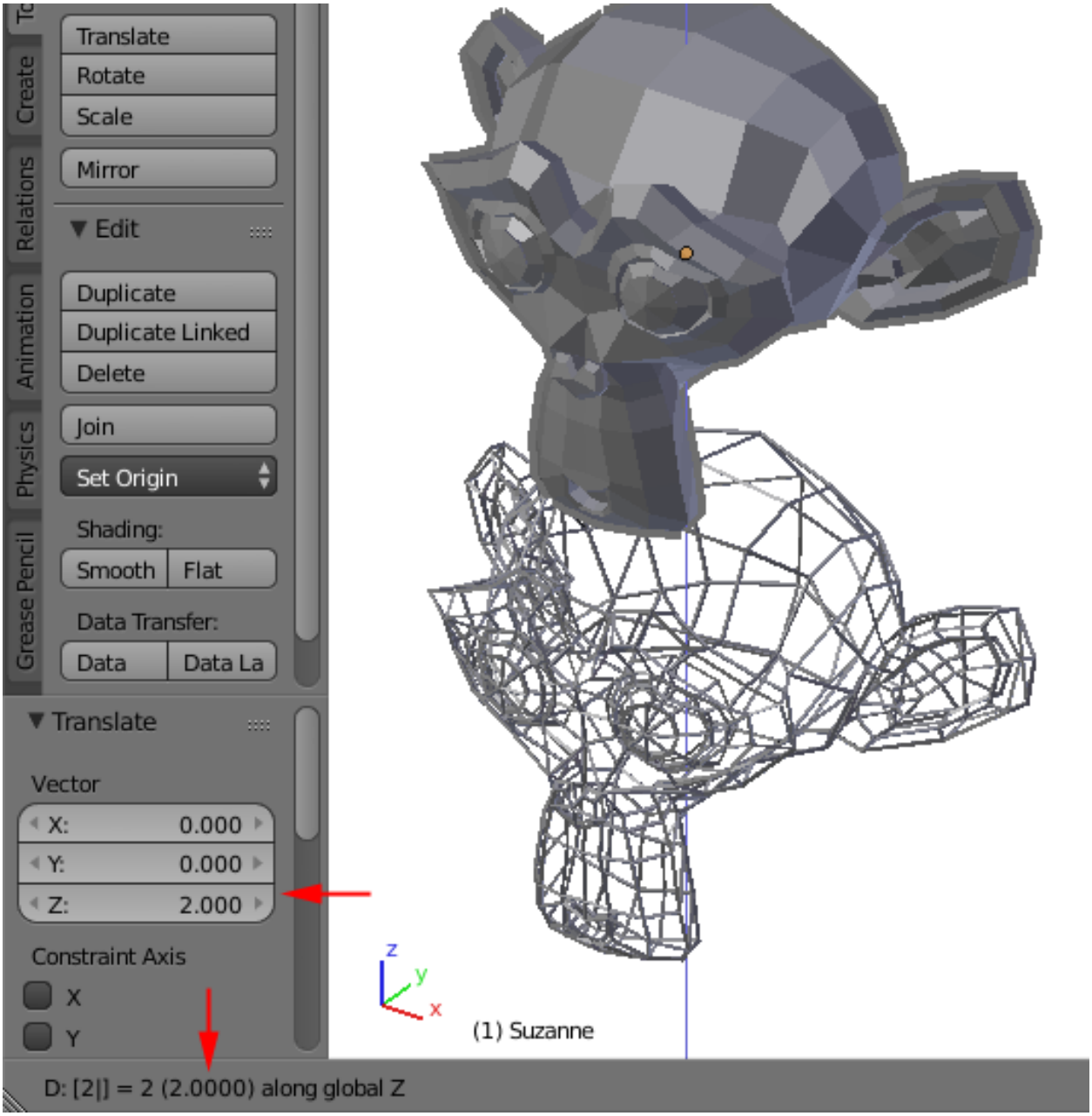


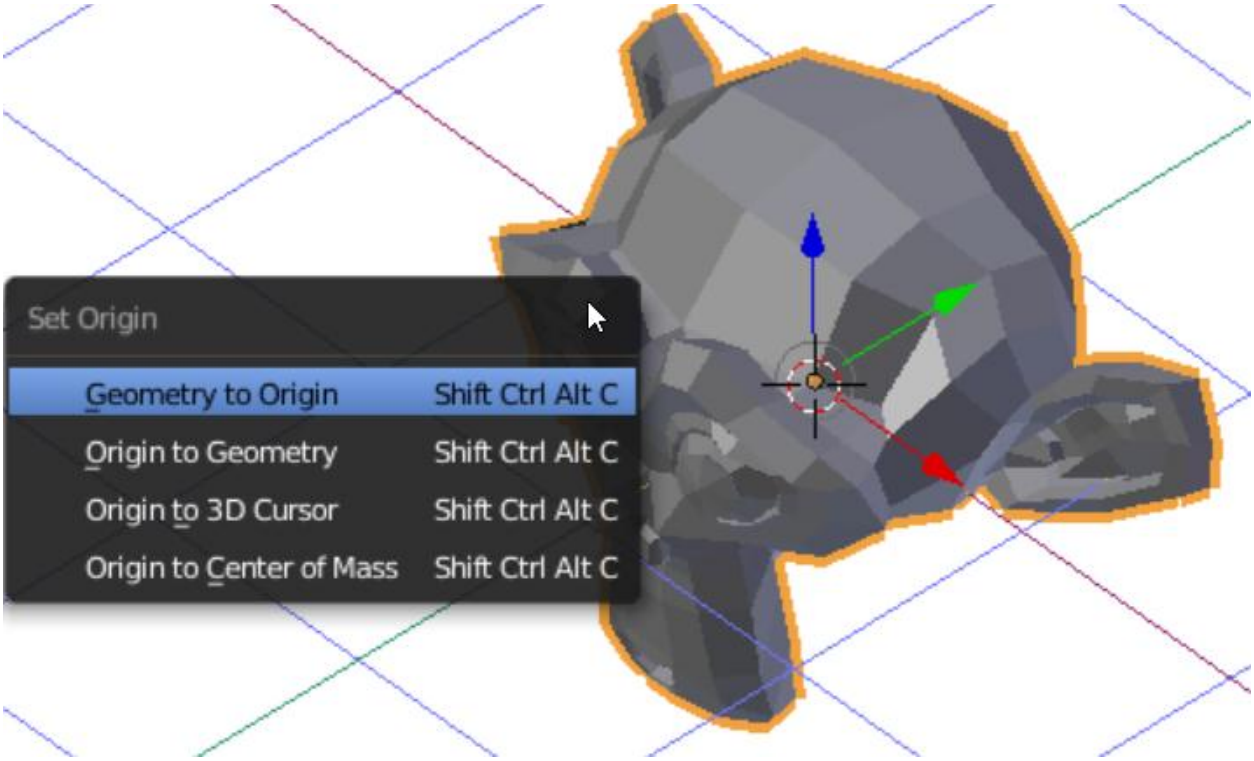


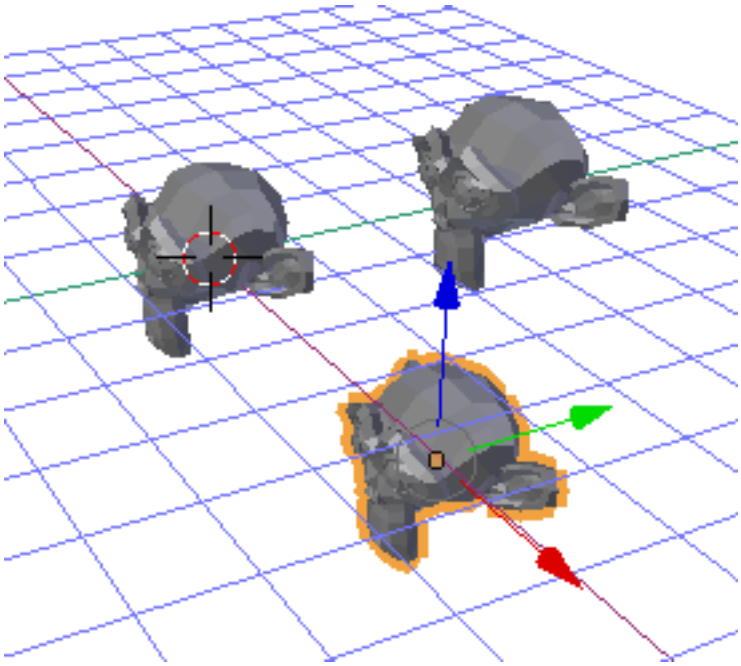


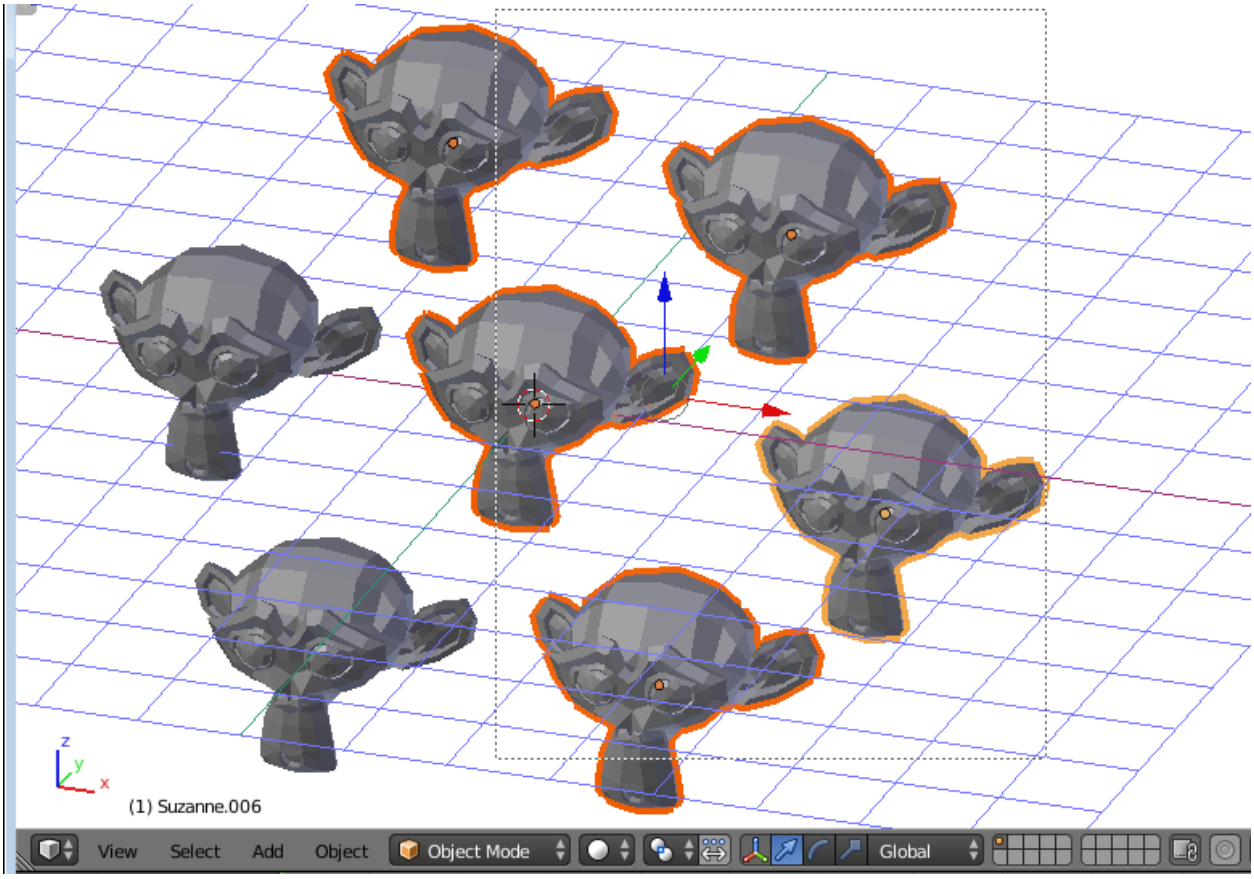


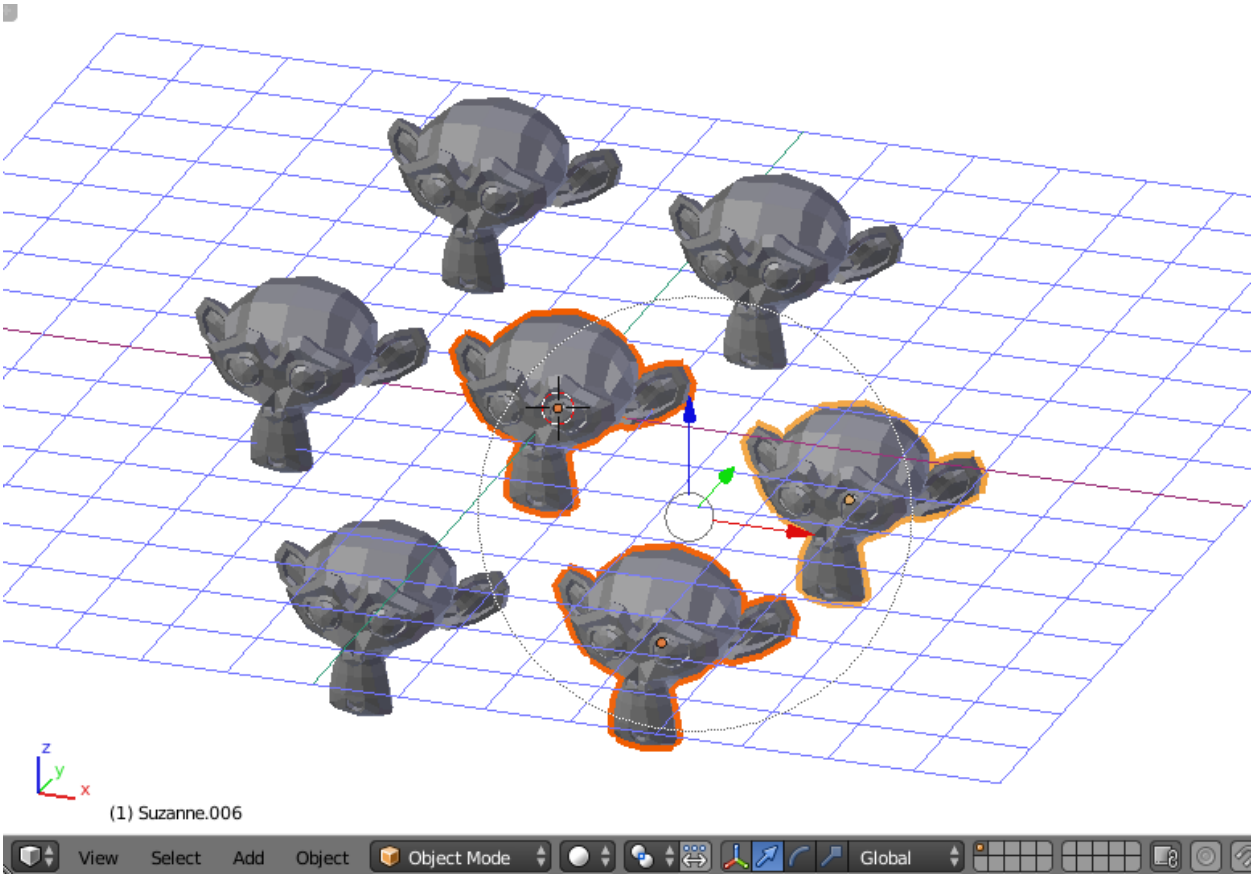


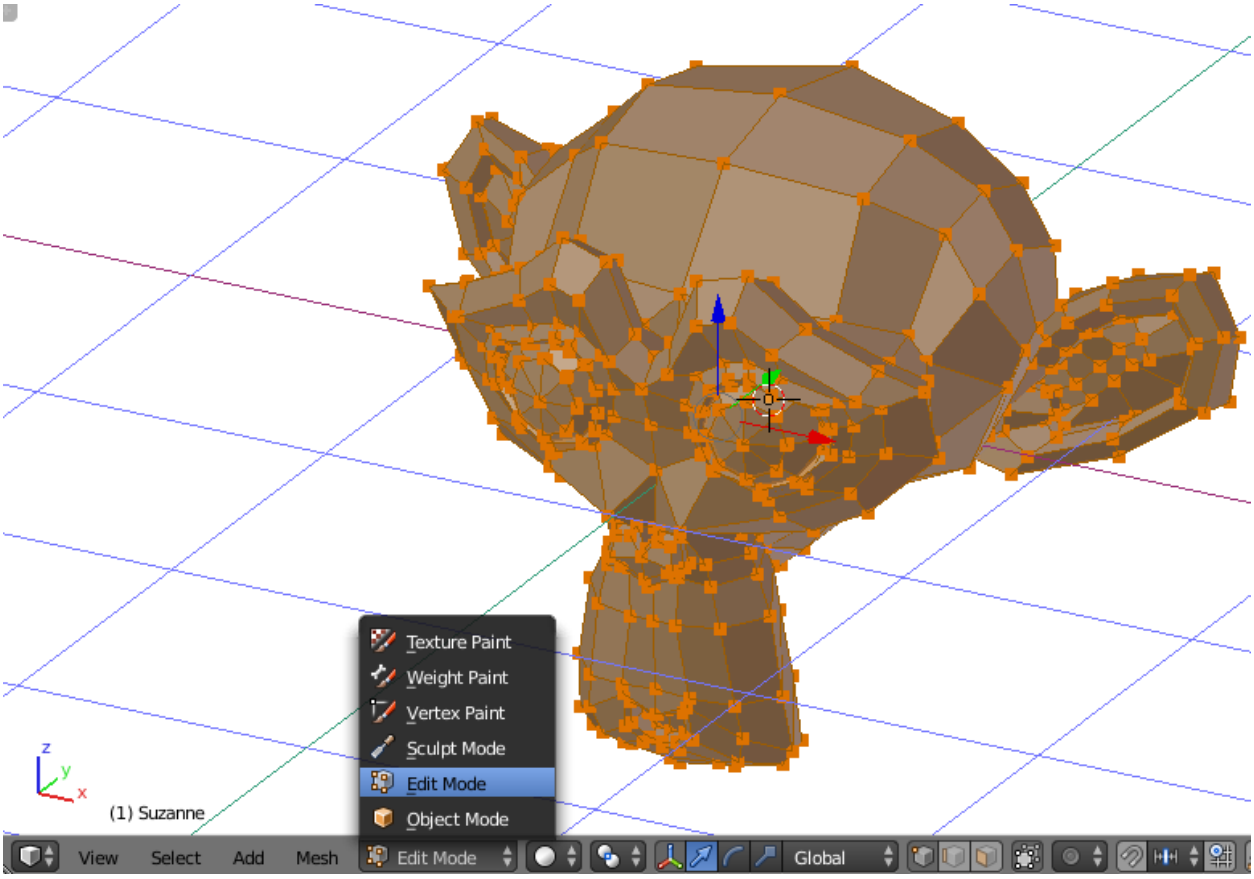

Translate
Rotate
Scale
Mirror
Edit
Duplicate
Duplicate Linked
Delete
Join
Set Origin
Shading:
Smooth
Flat
Data Transfer:
Data
Data La
Create
Relations
Animation
Physics
Grease Pencil
Translate
Vector
X: 0.000
Y: 0.000
Z: 2.000
Constraint Axis
X
Y
z
y
x
(1) Suzanne
D: [2|] = 2 (2.0000) along global Z

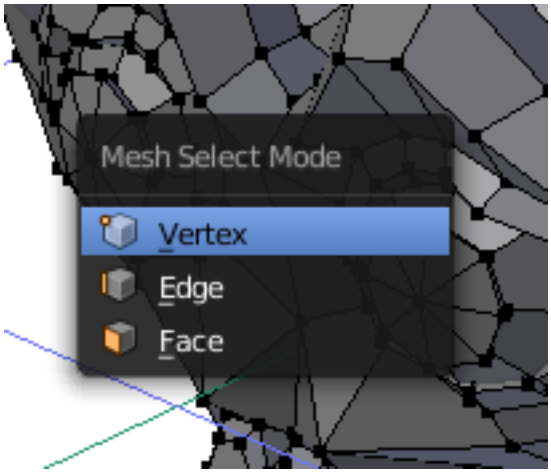

Set Origin
Geometry to Origin Shift Ctrl Alt C
Origin to Geometry Shift Ctrl Alt C
Origin to 3D Cursor Shift Ctrl Alt C
Origin to Center of Mass Shift Ctrl Alt C

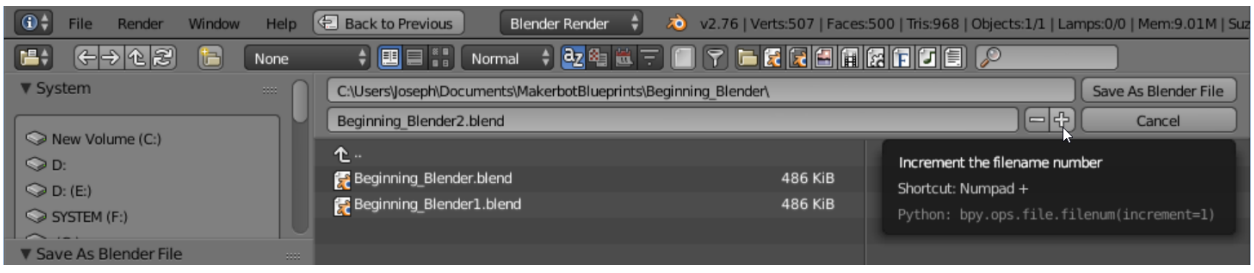


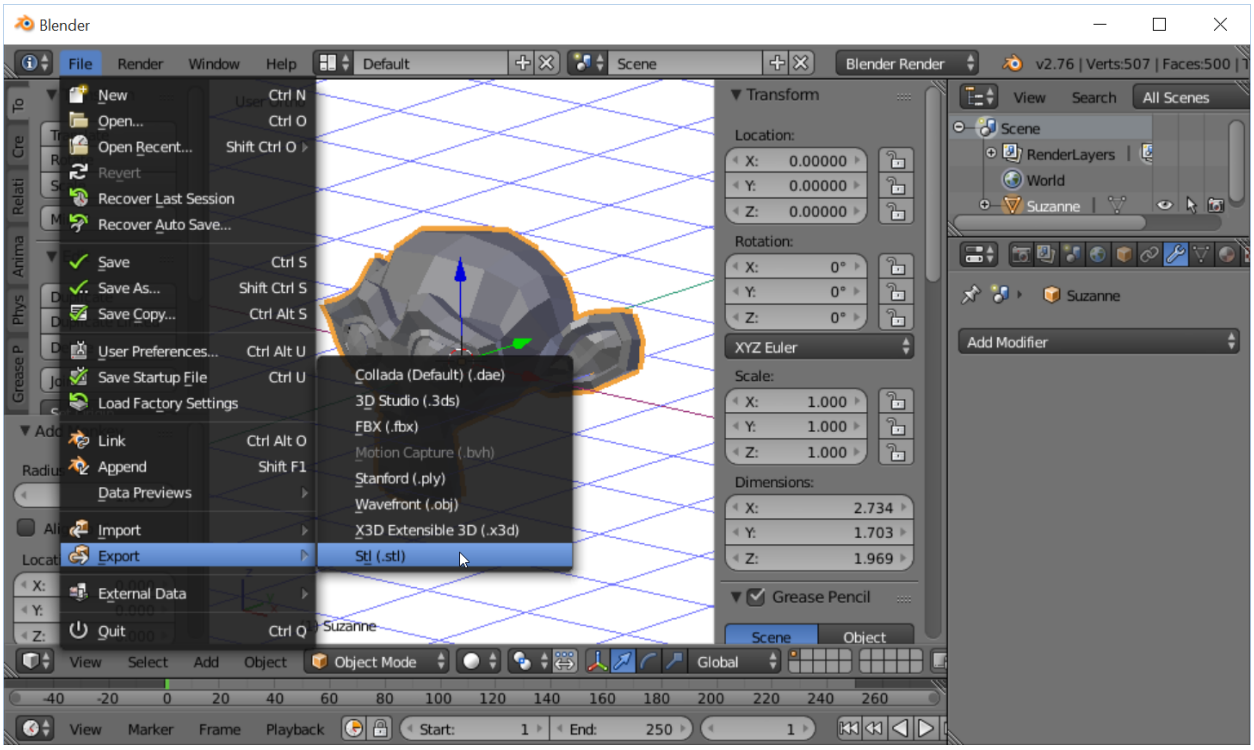

z
y
x
(1) Suzanne.006
View
Select
Add
Object
Object Mode
Global


z
y
x
(1) Suzanne.006
View
Select
Add
Object
Object Mode
Global

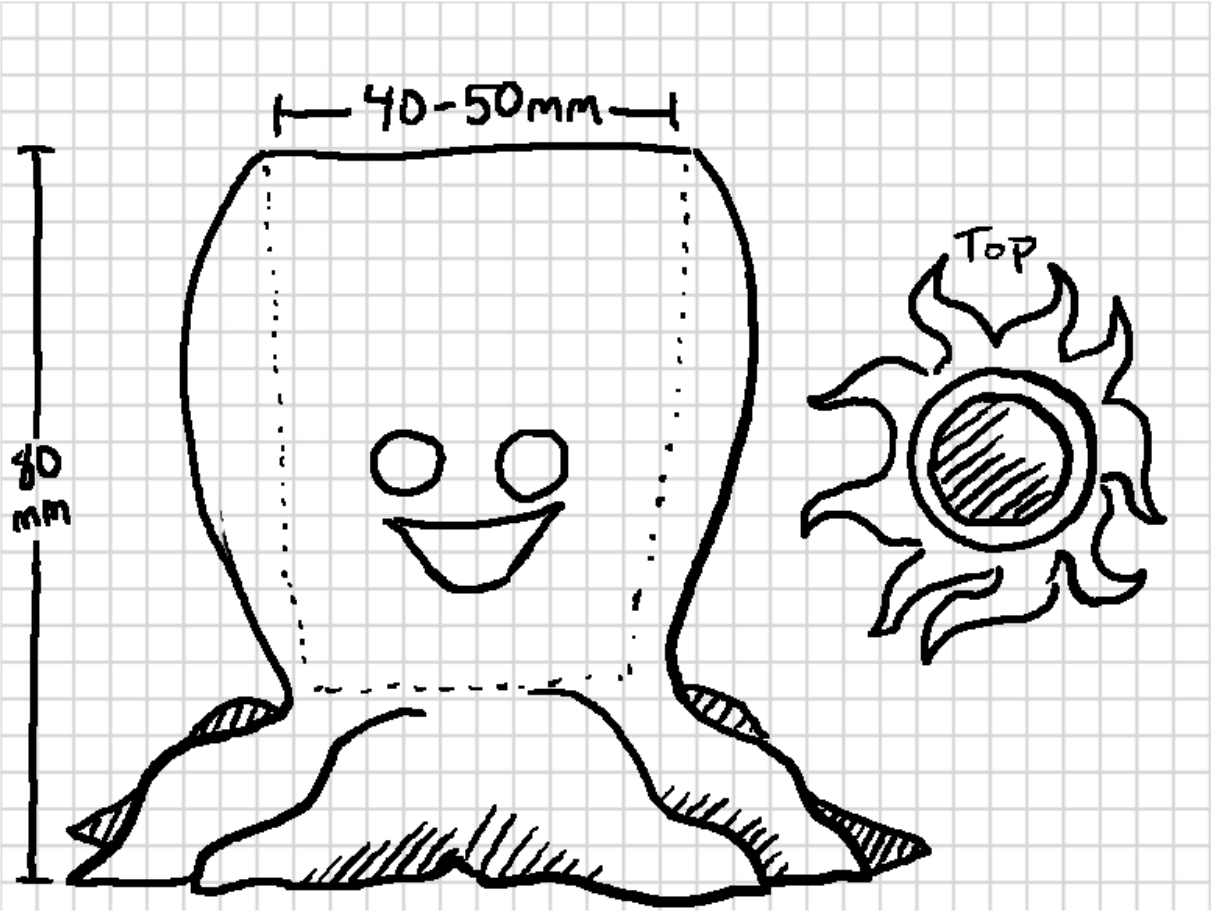

Texture Paint
Weight Paint
Vertex Paint
Sculpt Mode
Edit Mode
Object Mode
(1) Suzanne
View
Select
Add
Mesh
Edit Mode
Global

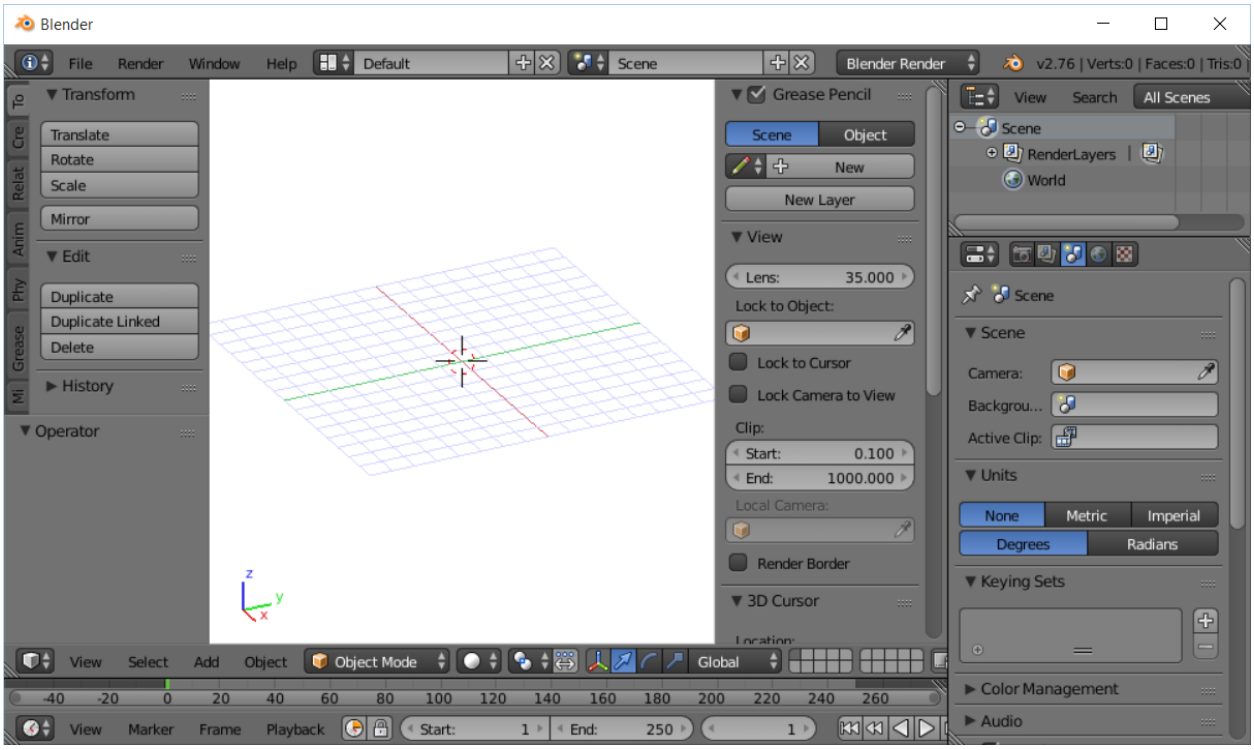

Mesh Select Mode
Vertex
Edge
Face

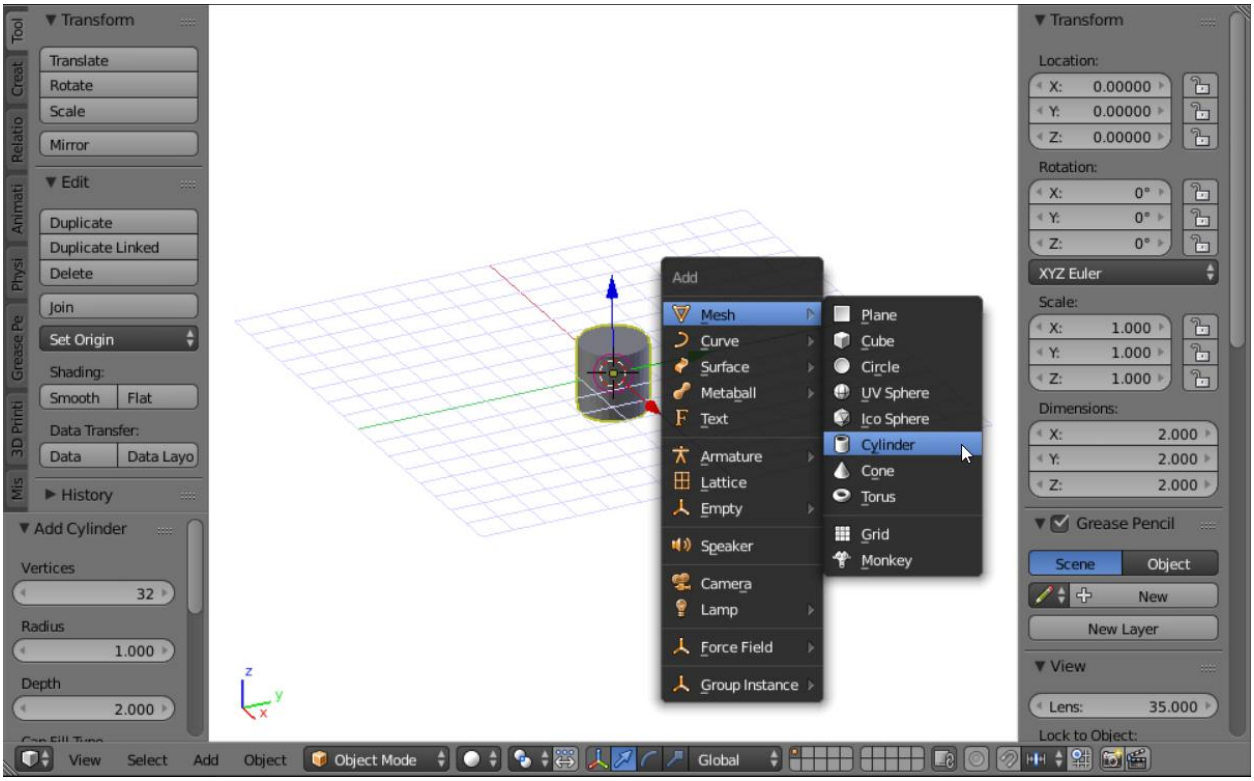

File
Render
Window
Help
Back to Previous
Blender Render
v2.76 | Verts:507 | Faces:500 | Tris:968 | Objects:1/1 | Lamps:0/0 | Mem:9.01M
None
Normal
System
New Volume (C:)
D:
D: (E:)
SYSTEM (F:)
Save As Blender File
C:\Users\Joseph\Documents\MakerbotBlueprints\Beginning_Blender\
Beginning_Blender2.blend
Save As Blender File
Cancel
Beginning_Blender.blend
486 KiB
Beginning_Blender1.blend
486 KiB
Increment the filename number
Shortcut: Numpad +
Python: bpy.ops.file.filenum(increment=1)

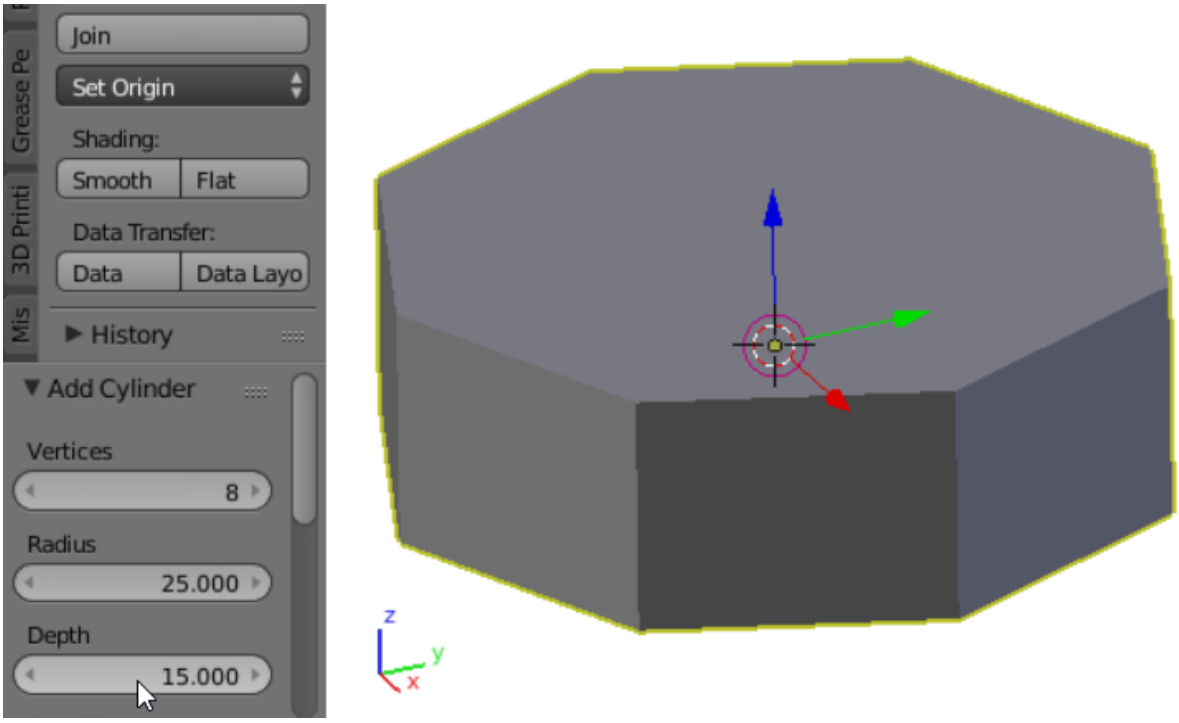

Blender
File
Render
Window
Help
Default
Scene
Blender Render
v2.76 | Verts:507 | Faces:500
New Ctrl N
Open... Ctrl O
Open Recent... Shift Ctrl O
Revert
Recover Last Session
Recover Auto Save...
Save Ctrl S
Save As... Shift Ctrl S
Save Copy... Ctrl Alt S
User Preferences... Ctrl Alt U
Save Startup File Ctrl U
Load Factory Settings
Link Ctrl Alt O
Append Shift F1
Data Previews
Import
Export
External Data
Quit Ctrl Q
Collada (Default) (.dae)
3D Studio (.3ds)
FBX (.fbx)
Motion Capture (.bvh)
Stanford (.ply)
Wavefront (.obj)
X3D Extensible 3D (.x3d)
Stl (.stl)
Transform
Location:
X: 0.00000
Y: 0.00000
Z: 0.00000
Rotation:
X: 0°
Y: 0°
Z: 0°
XYZ Euler
Scale:
X: 1.000
Y: 1.000
Z: 1.000
Dimensions:
X: 2.734
Y: 1.703
Z: 1.969
Grease Pencil
Scene
Object
View
Search
All Scenes
Scene
RenderLayers
World
Suzanne
Add Modifier
Suzanne
View
Select
Add
Object
Object Mode
Global
View
Marker
Frame
Playback
Start: 1
End: 250
1

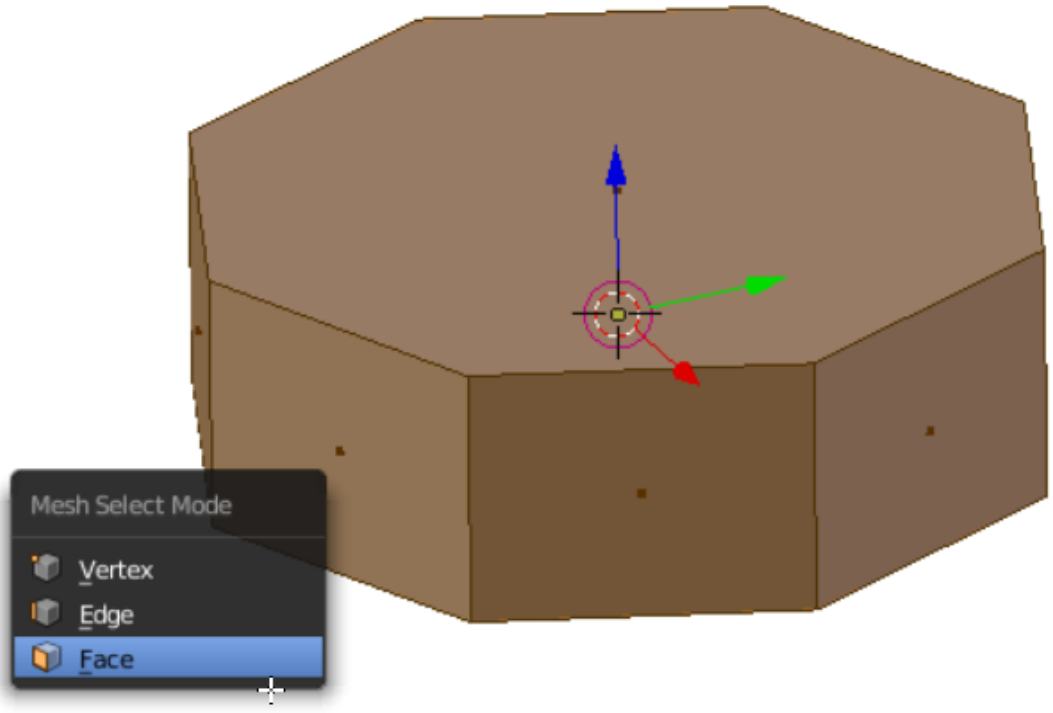
Chapter 3: The Octopus Pencil Holder



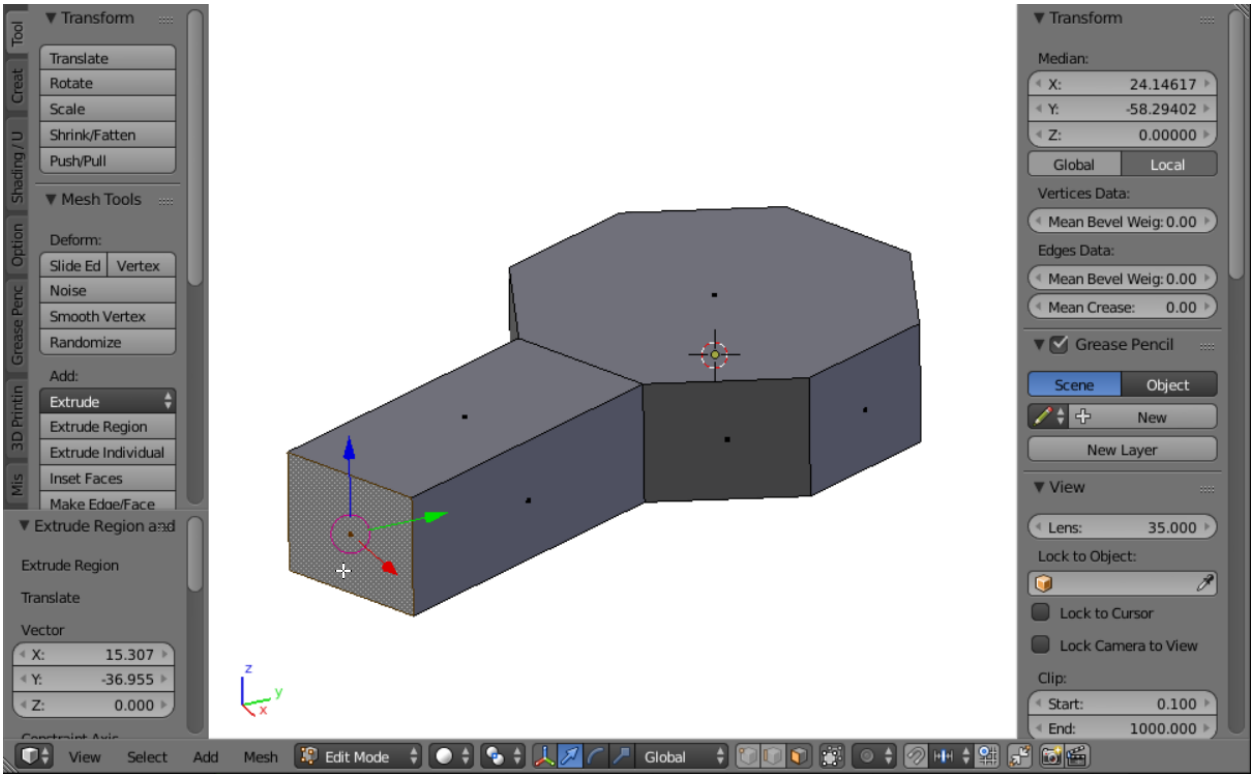

Blender
File
Render
Window
Help
Default
Scene
Blender Render
v2.76 | Verts:0 | Faces:0 | Tris:0
Transform
Translate
Rotate
Scale
Mirror
Edit
Duplicate
Duplicate Linked
Delete
History
Operator
Grease Pencil
Scene
Object
New
New Layer
View
Lens: 35.000
Lock to Object:
Lock to Cursor
Lock Camera to View
Clip:
Start: 0.100
End: 1000.000
Local Camera:
Render Border
3D Cursor
View
Search
All Scenes
Scene
RenderLayers
World
Camera:
Backgrou...
Active Clip:
Units
None
Metric
Imperial
Degrees
Radians
Keying Sets
Color Management
Audio
View
Select
Add
Object
Object Mode
Global
Marker
Frame
Playback
Start: 1
End: 250

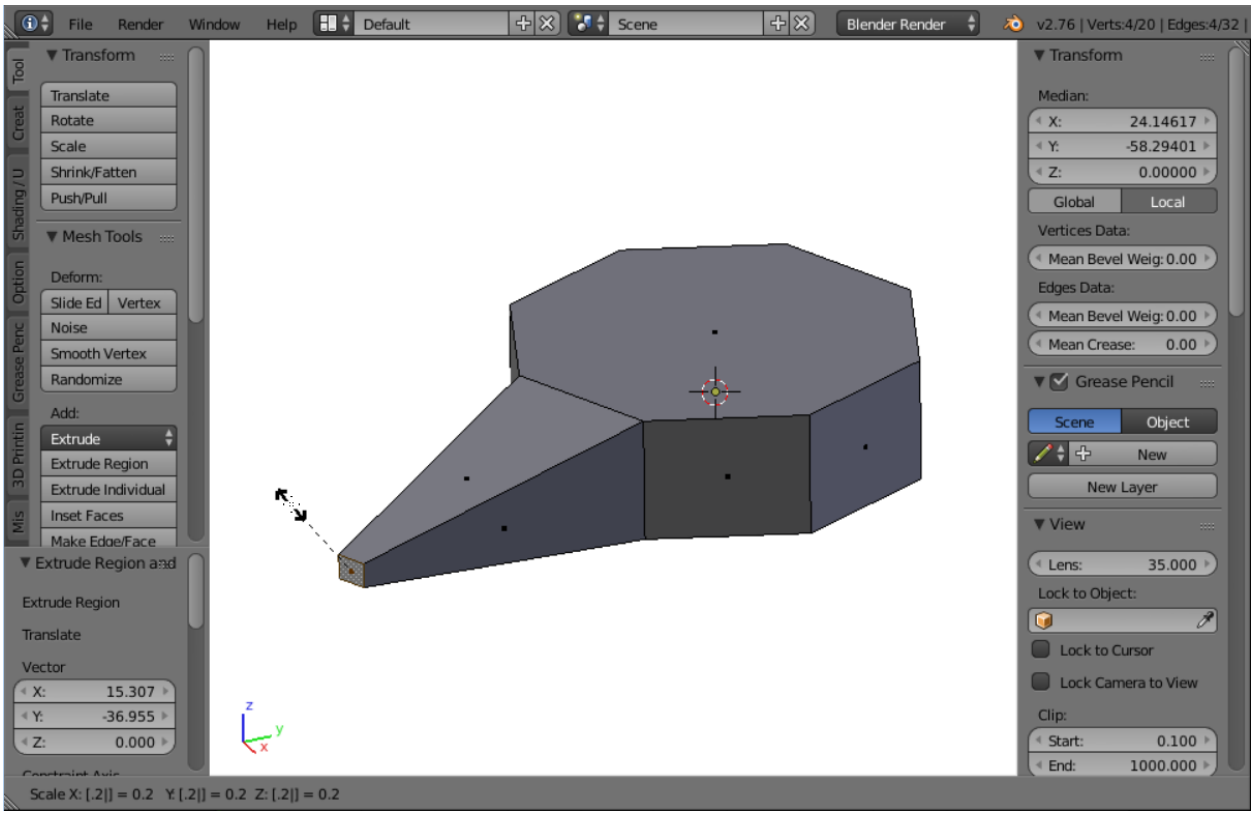

Transform
Translate
Rotate
Scale
Mirror
Edit
Duplicate
Duplicate Linked
Delete
Join
Set Origin
Shading:
Smooth
Flat
Data Transfer:
Data
Data Layo
History
Add Cylinder
Vertices
32
Radius
1.000
Depth
2.000
Add
Mesh
Curve
Surface
Metaball
Text
Armature
Lattice
Empty
Speaker
Camera
Lamp
Force Field
Group Instance
Plane
Cube
Circle
UV Sphere
Ico Sphere
Cylinder
Cone
Torus
Grid
Monkey
Transform
Location:
X: 0.00000
Y: 0.00000
Z: 0.00000
Rotation:
X: 0°
Y: 0°
Z: 0°
XYZ Euler
Scale:
X: 1.000
Y: 1.000
Z: 1.000
Dimensions:
X: 2.000
Y: 2.000
Z: 2.000
Grease Pencil
Scene
Object
New
New Layer
View
Lens: 35.000
Lock to Object:
View
Select
Add
Object
Object Mode
Global

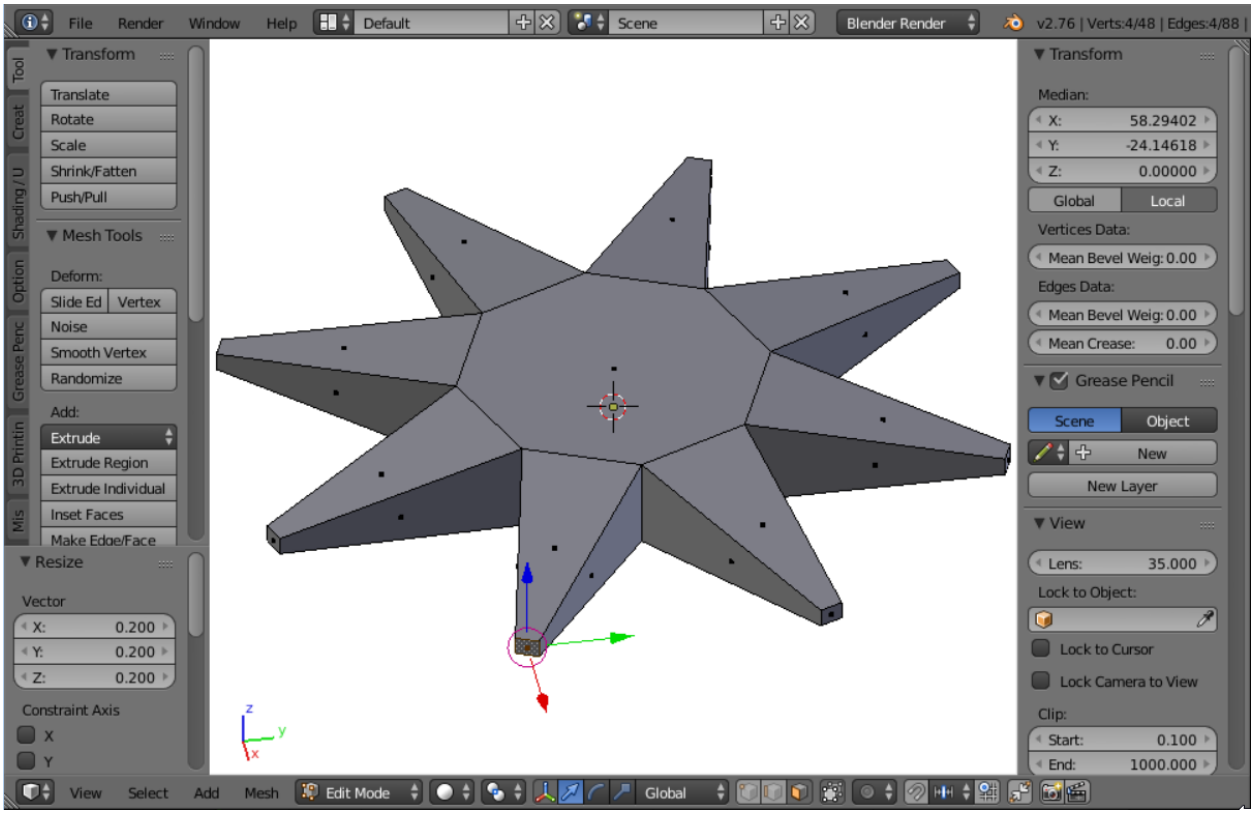

Join
Set Origin
Shading:
Smooth
Flat
Data Transfer:
Data
Data Layo
History
Add Cylinder
Vertices
8
Radius
25.000
Depth
15.000
z
y
x

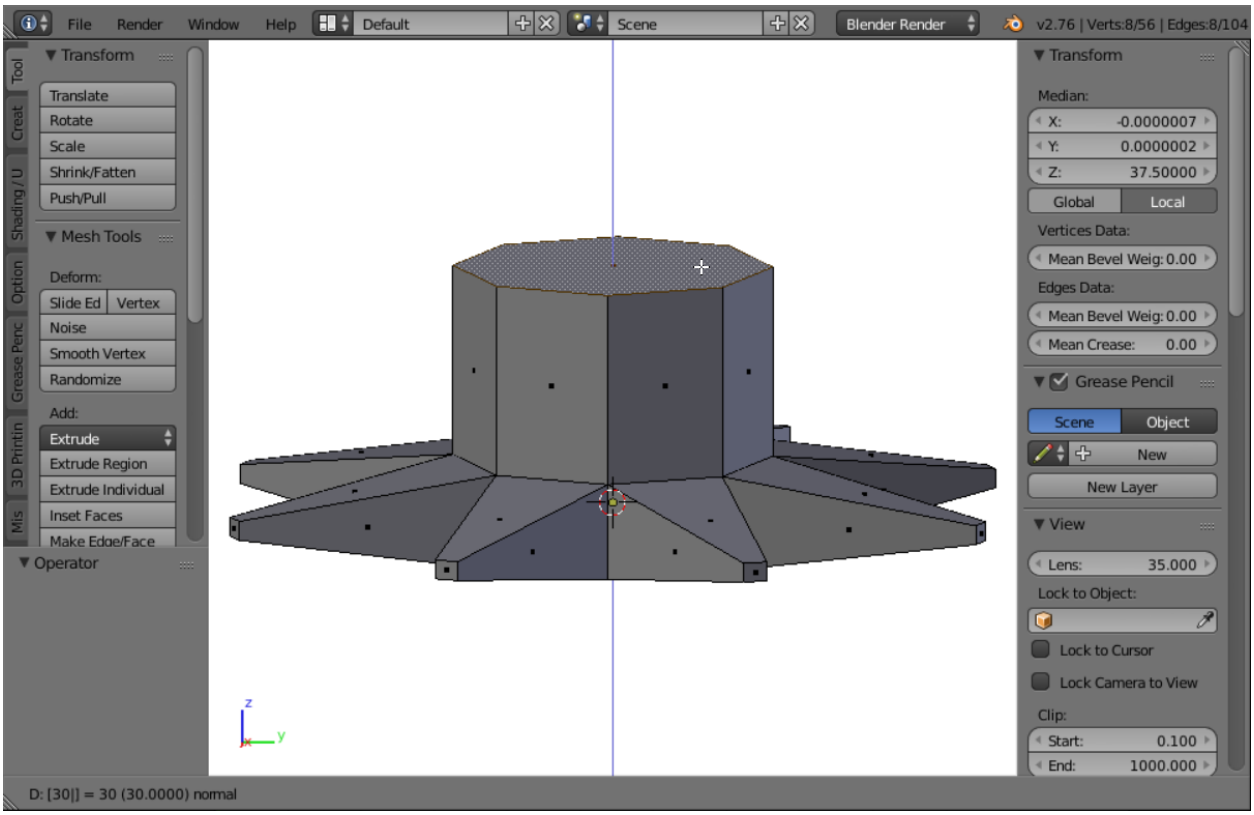

Mesh Select Mode
Vertex
Edge
Face

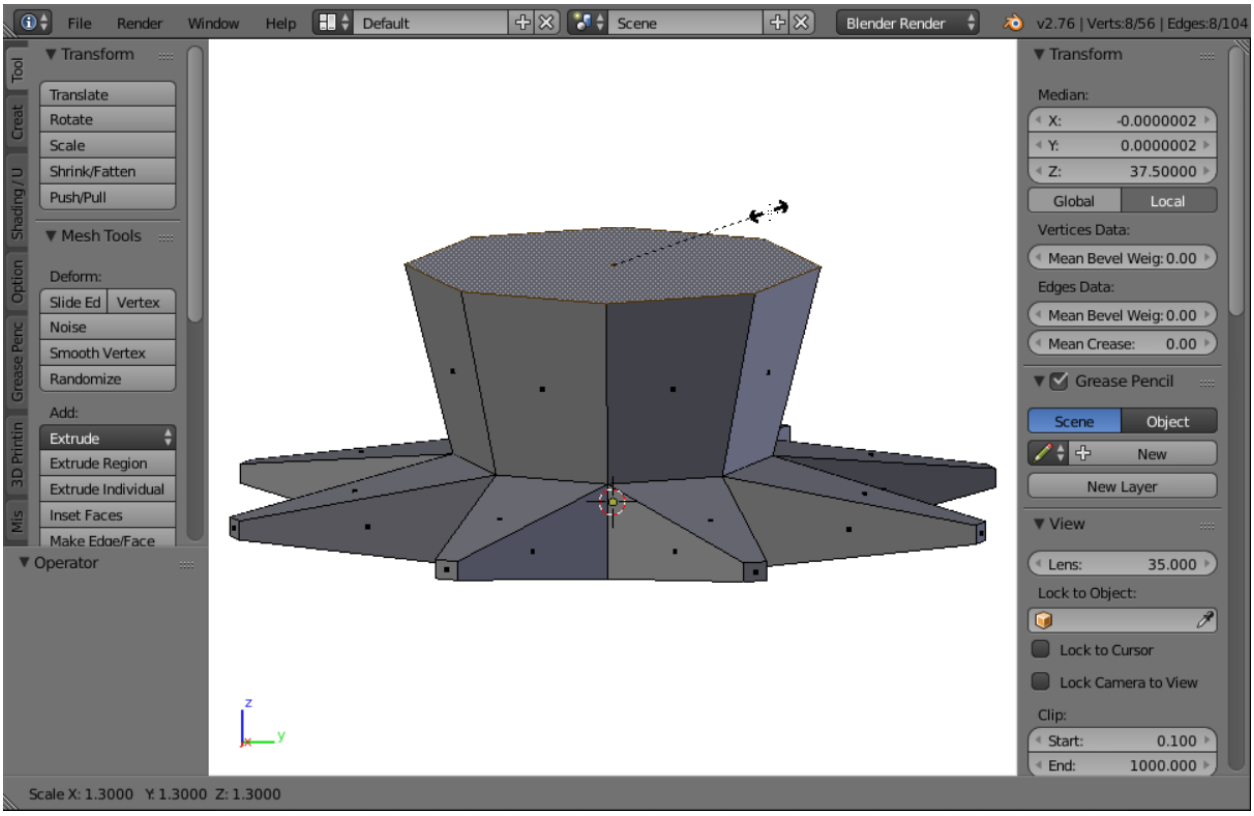
z
y
x

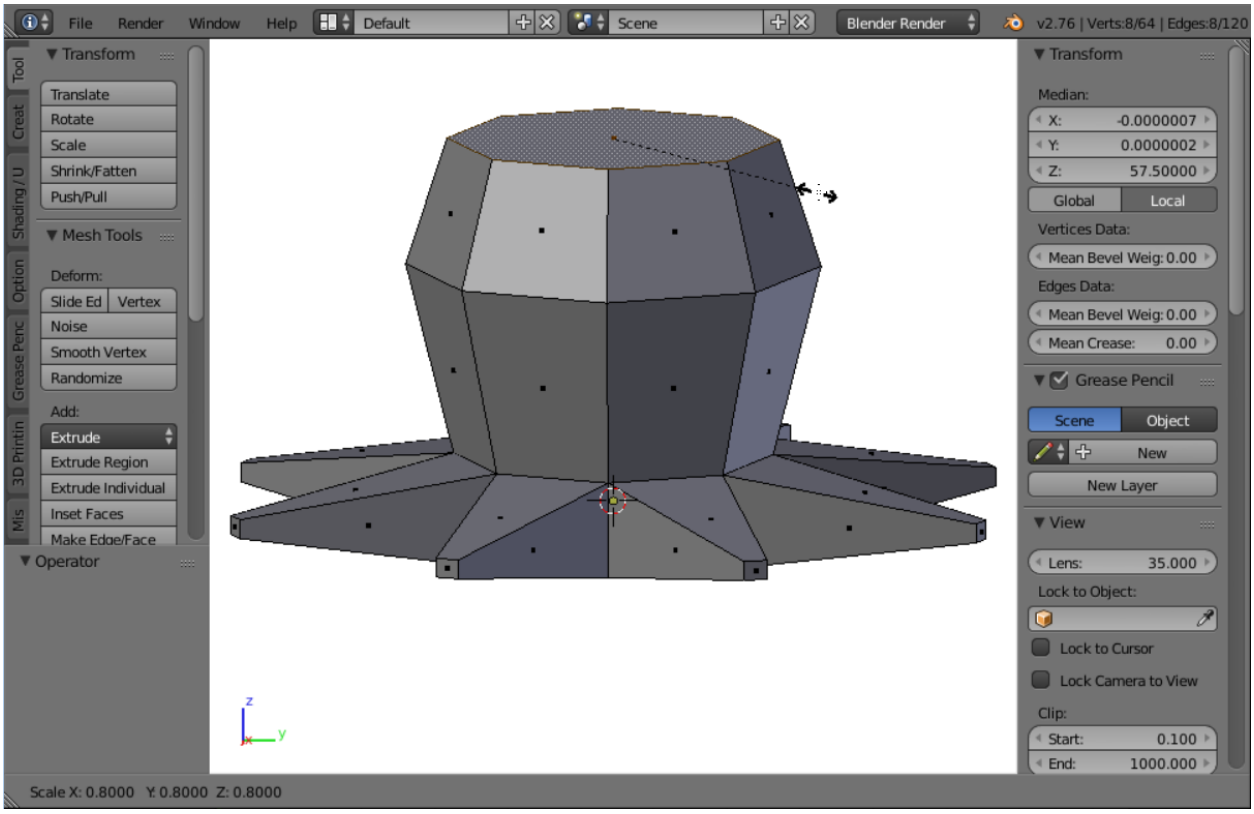

Transform
Translate
Rotate
Scale
Shrink/Fatten
Push/Pull
Mesh Tools
Deform:
Slide Ed
Vertex
Noise
Smooth Vertex
Randomize
Add:
Extrude
Extrude Region
Extrude Individual
Inset Faces
Make Edge/Face
Extrude Region and
Extrude Region
Translate
Vector
X: 15.307
Y: -36.955
Z: 0.000
Median:
X: 24.14617
Y: -58.29402
Z: 0.00000
Global
Local
Vertices Data:
Mean Bevel Weig: 0.00
Edges Data:
Mean Bevel Weig: 0.00
Mean Crease: 0.00
Grease Pencil
Scene
Object
New
New Layer
View
Lens: 35.000
Lock to Object:
Lock to Cursor
Lock Camera to View
Clip:
Start: 0.100
End: 1000.000
View
Select
Add
Mesh
Edit Mode
Global

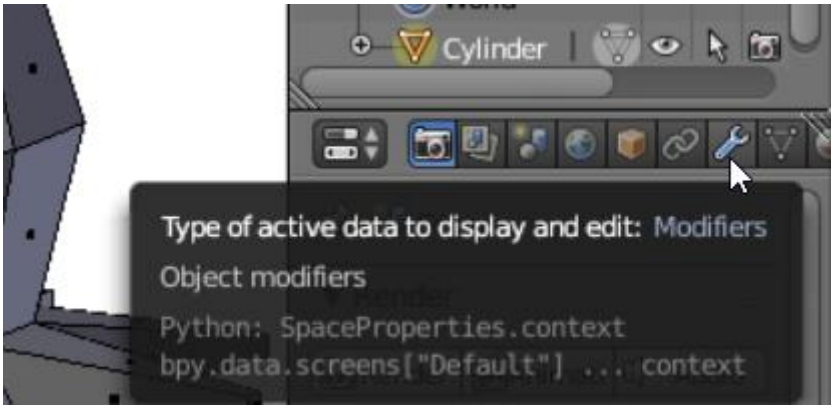

File
Render
Window
Help
Default
Scene
Blender Render
v2.76 | Verts:4/20 | Edges:4/32 |
Transform
Translate
Rotate
Scale
Shrink/Fatten
Push/Pull
Mesh Tools
Deform:
Slide Ed
Vertex
Noise
Smooth Vertex
Randomize
Add:
Extrude
Extrude Region
Extrude Individual
Inset Faces
Make Edge/Face
Extrude Region and
Extrude Region
Translate
Vector
X: 15.307
Y: -36.955
Z: 0.000
Median:
X: 24.14617
Y: -58.29401
Z: 0.00000
Global
Local
Vertices Data:
Mean Bevel Weig: 0.00
Edges Data:
Mean Bevel Weig: 0.00
Mean Crease: 0.00
Grease Pencil
Scene
Object
New
New Layer
View
Lens: 35.000
Lock to Object:
Lock to Cursor
Lock Camera to View
Clip:
Start: 0.100
End: 1000.000
Scale X: [.2|] = 0.2 Y: [.2|] = 0.2 Z: [.2|] = 0.2

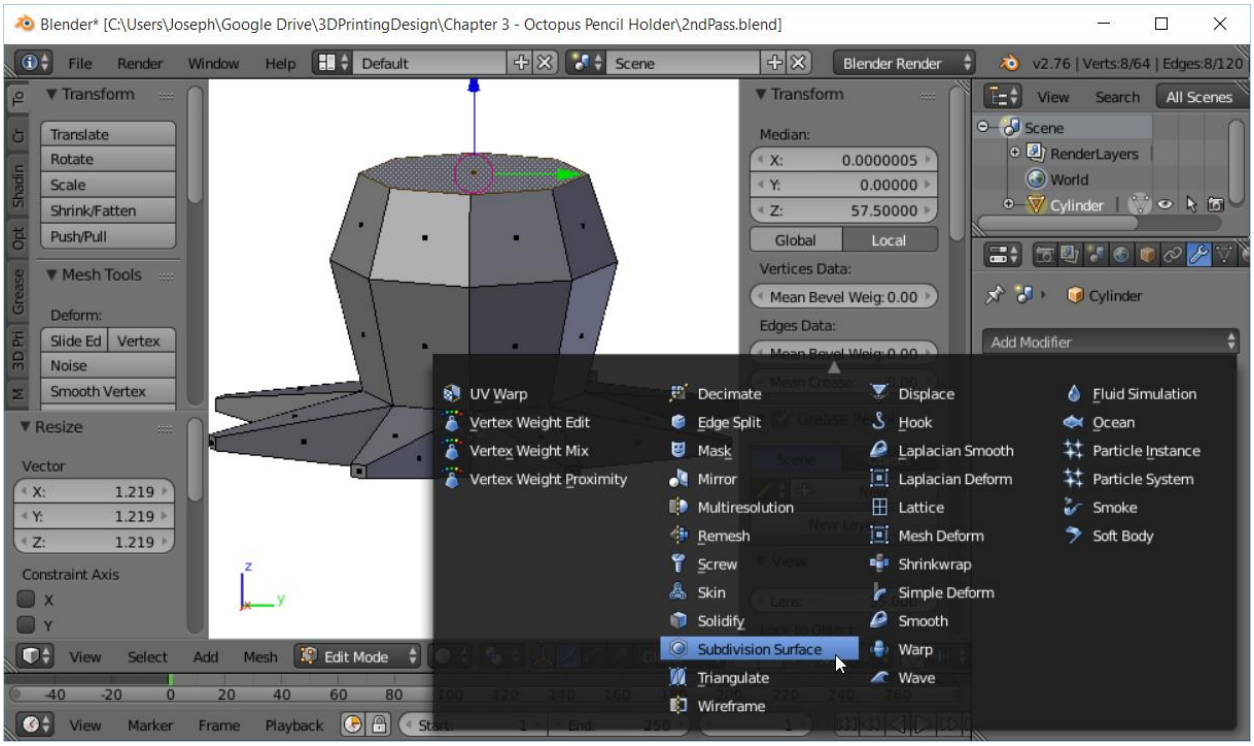

File Render Window Help Default Scene Blender Render v2.76 | Verts:4/48 | Edges:4/88 |
Transform
Translate
Rotate
Scale
Shrink/Fatten
Push/Pull
Mesh Tools
Deform:
Slide Ed Vertex
Noise
Smooth Vertex
Randomize
Add:
Extrude
Extrude Region
Extrude Individual
Inset Faces
Make Edge/Face
Resize
Vector
X: 0.200
Y: 0.200
Z: 0.200
Constraint Axis
X
Y
Median:
X: 58.29402
Y: -24.14618
Z: 0.00000
Global Local
Vertices Data:
Mean Bevel Weig: 0.00
Edges Data:
Mean Bevel Weig: 0.00
Mean Crease: 0.00
Grease Pencil
Scene Object
New
New Layer
View
Lens: 35.000
Lock to Object:
Lock to Cursor
Lock Camera to View
Clip:
Start: 0.100
End: 1000.000
View Select Add Mesh Edit Mode Global

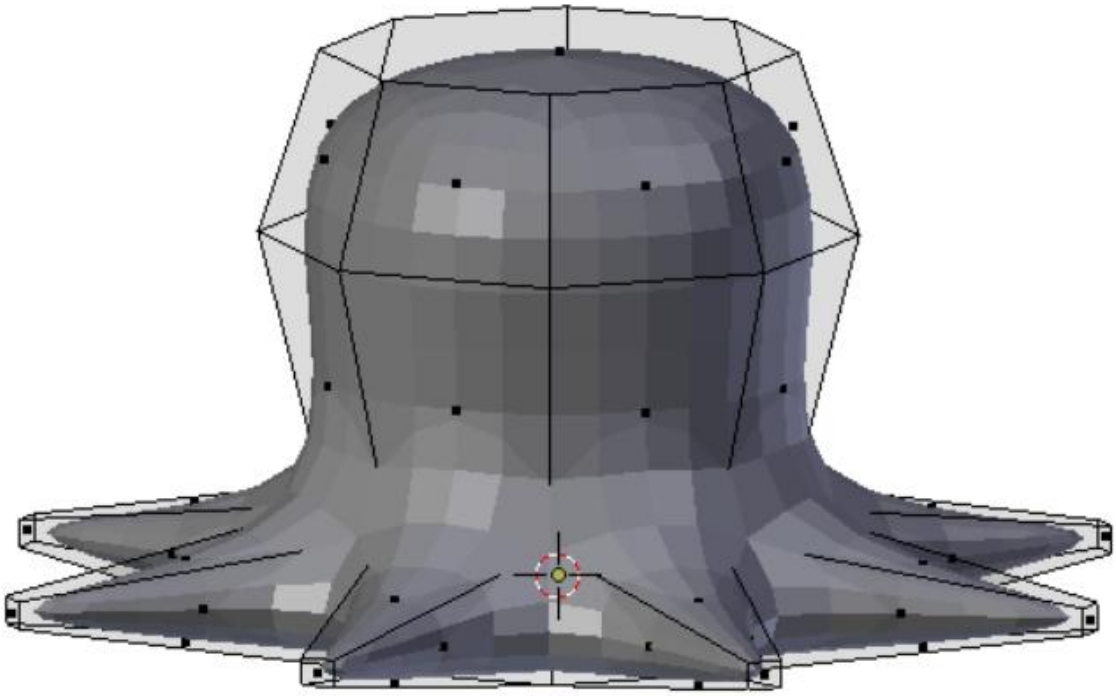

File Render Window Help Default Scene Blender Render v2.76 | Verts:8/56 | Edges:8/104
Transform
Translate
Rotate
Scale
Shrink/Fatten
Push/Pull
Mesh Tools
Deform:
Slide Ed Vertex
Noise
Smooth Vertex
Randomize
Add:
Extrude
Extrude Region
Extrude Individual
Inset Faces
Make Edge/Face
Operator
Median:
X: -0.0000007
Y: 0.0000002
Z: 37.50000
Global Local
Vertices Data:
Mean Bevel Weig: 0.00
Edges Data:
Mean Bevel Weig: 0.00
Mean Crease: 0.00
Grease Pencil
Scene Object
New
New Layer
View
Lens: 35.000
Lock to Object:
Lock to Cursor
Lock Camera to View
Clip:
Start: 0.100
End: 1000.000
D: [30|] = 30 (30.0000) normal

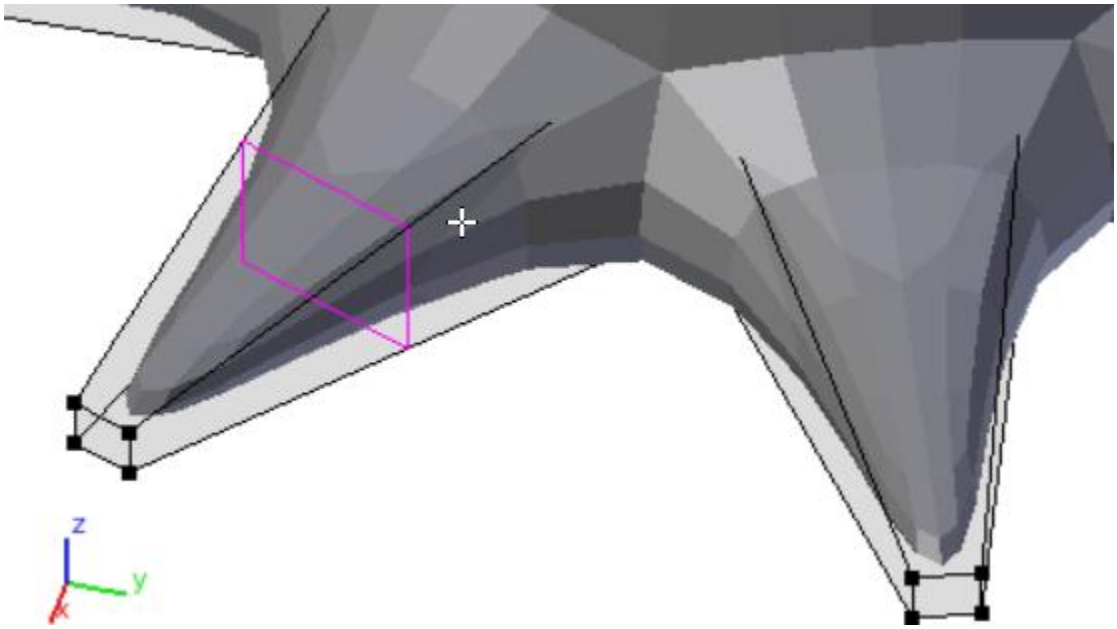

File
Render
Window
Help
Default
Scene
Blender Render
v2.76 | Verts:8/56 | Edges:8/104
Transform
Translate
Rotate
Scale
Shrink/Fatten
Push/Pull
Mesh Tools
Deform:
Slide Ed
Vertex
Noise
Smooth Vertex
Randomize
Add:
Extrude
Extrude Region
Extrude Individual
Inset Faces
Make Edge/Face
Operator
Median:
X: -0.0000002
Y: 0.0000002
Z: 37.50000
Global
Local
Vertices Data:
Mean Bevel Weig: 0.00
Edges Data:
Mean Bevel Weig: 0.00
Mean Crease: 0.00
Grease Pencil
Scene
Object
New
New Layer
View
Lens: 35.000
Lock to Object:
Lock to Cursor
Lock Camera to View
Clip:
Start: 0.100
End: 1000.000
Scale X: 1.3000 Y: 1.3000 Z: 1.3000

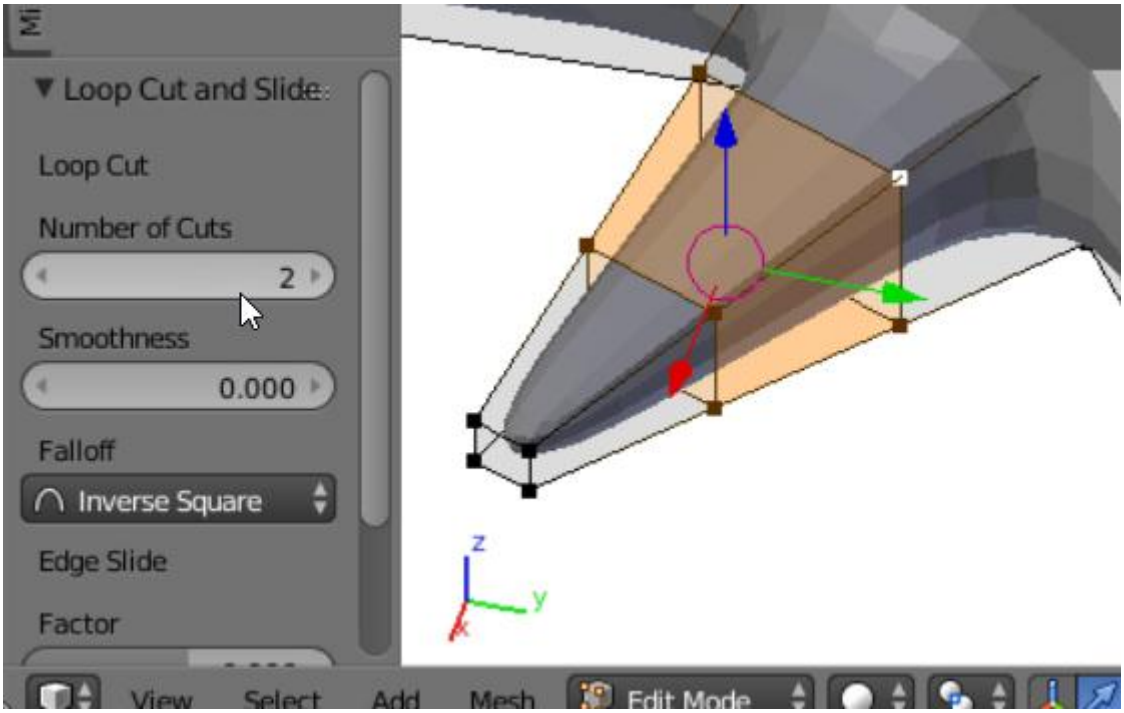

File
Render
Window
Help
Default
Scene
Blender Render
v2.76 | Verts:8/64 | Edges:8/120
Transform
Translate
Rotate
Scale
Shrink/Fatten
Push/Pull
Mesh Tools
Deform:
Slide Ed
Vertex
Noise
Smooth Vertex
Randomize
Add:
Extrude
Extrude Region
Extrude Individual
Inset Faces
Make Edge/Face
Operator
Median:
X: -0.0000007
Y: 0.0000002
Z: 57.50000
Global
Local
Vertices Data:
Mean Bevel Weig: 0.00
Edges Data:
Mean Bevel Weig: 0.00
Mean Crease: 0.00
Grease Pencil
Scene
Object
New
New Layer
View
Lens: 35.000
Lock to Object:
Lock to Cursor
Lock Camera to View
Clip:
Start: 0.100
End: 1000.000
Scale X: 0.8000 Y: 0.8000 Z: 0.8000

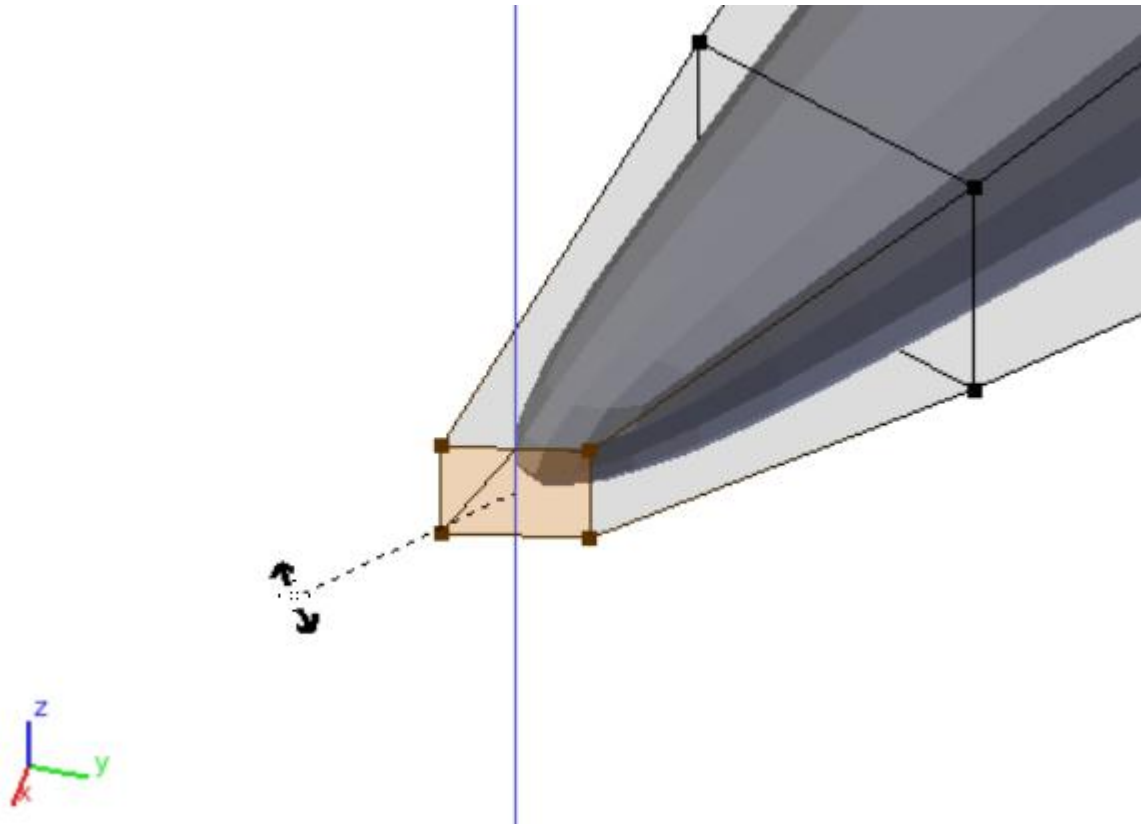

Cylinder
Type of active data to display and edit: Modifiers
Object modifiers
Python: SpaceProperties.context
bpy.data.screens["Default"] ... context

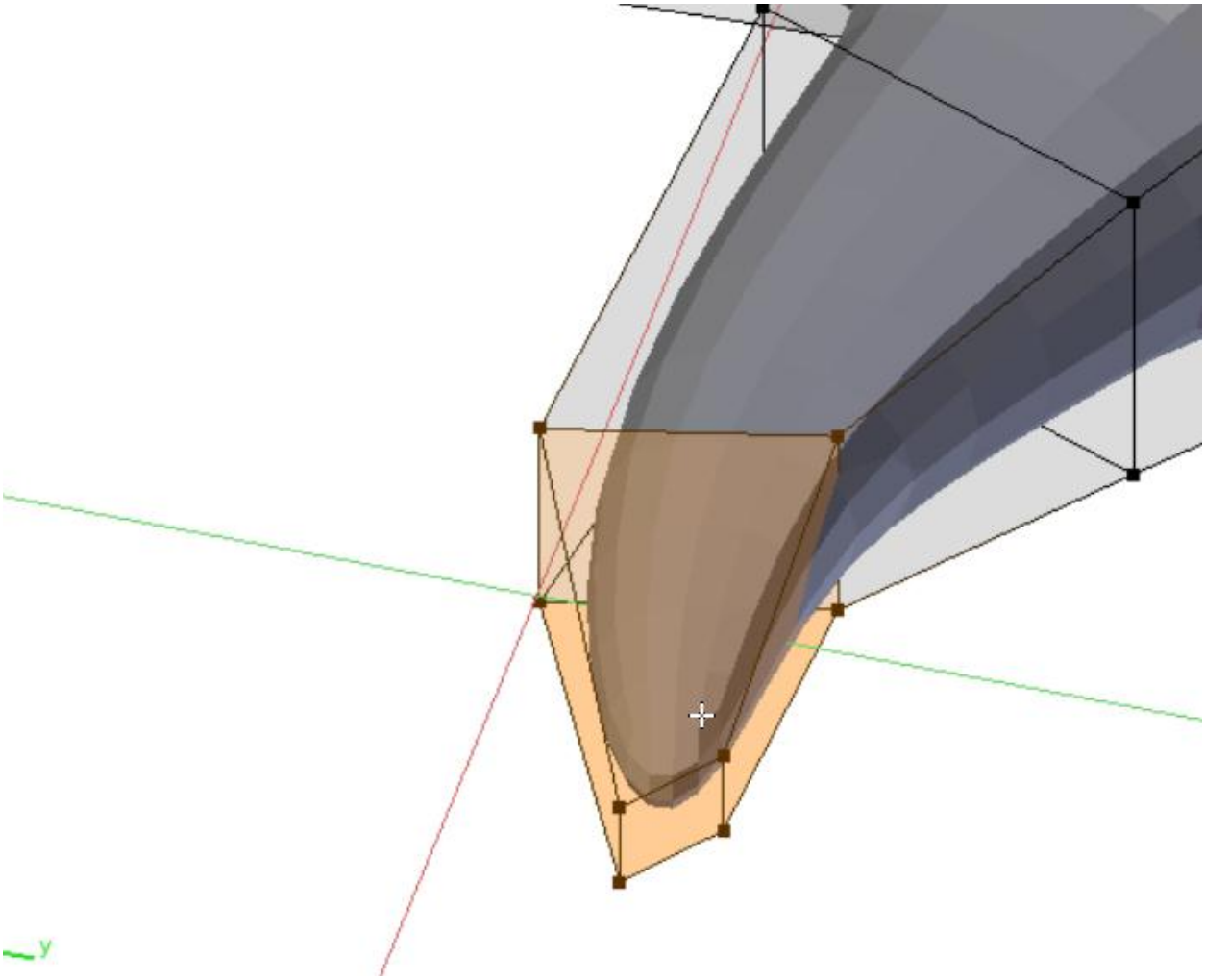

Blender* [C:\Users\Joseph\Google Drive\3DPrintingDesign\Chapter 3 - Octopus Pencil Holder\2ndPass.blend]
File Render Window Help Default Scene Blender Render v2.76 | Verts:8/64 | Edges:8/120
Transform
Translate
Rotate
Scale
Shrink/Fatten
Push/Pull
Mesh Tools
Deform:
Slide Ed Vertex
Noise
Smooth Vertex
Resize
Vector
X: 1.219
Y: 1.219
Z: 1.219
Constraint Axis
X
Y
Median:
X: 0.0000005
Y: 0.00000
Z: 57.50000
Global Local
Vertices Data:
Mean Bevel Weig: 0.00
Edges Data:
View Search All Scenes
Scene
RenderLayers
World
Cylinder
Add Modifier
UV Warp
Vertex Weight Edit
Vertex Weight Mix
Vertex Weight Proximity
Decimate
Edge Split
Mask
Mirror
Multiresolution
Remesh
Screw
Skin
Solidify
Subdivision Surface
Triangulate
Wireframe
Displace
Hook
Laplacian Smooth
Laplacian Deform
Lattice
Mesh Deform
Shrinkwrap
Simple Deform
Smooth
Warp
Wave
Fluid Simulation
Ocean
Particle Instance
Particle System
Smoke
Soft Body
View Select Add Mesh Edit Mode
View Marker Frame Playback

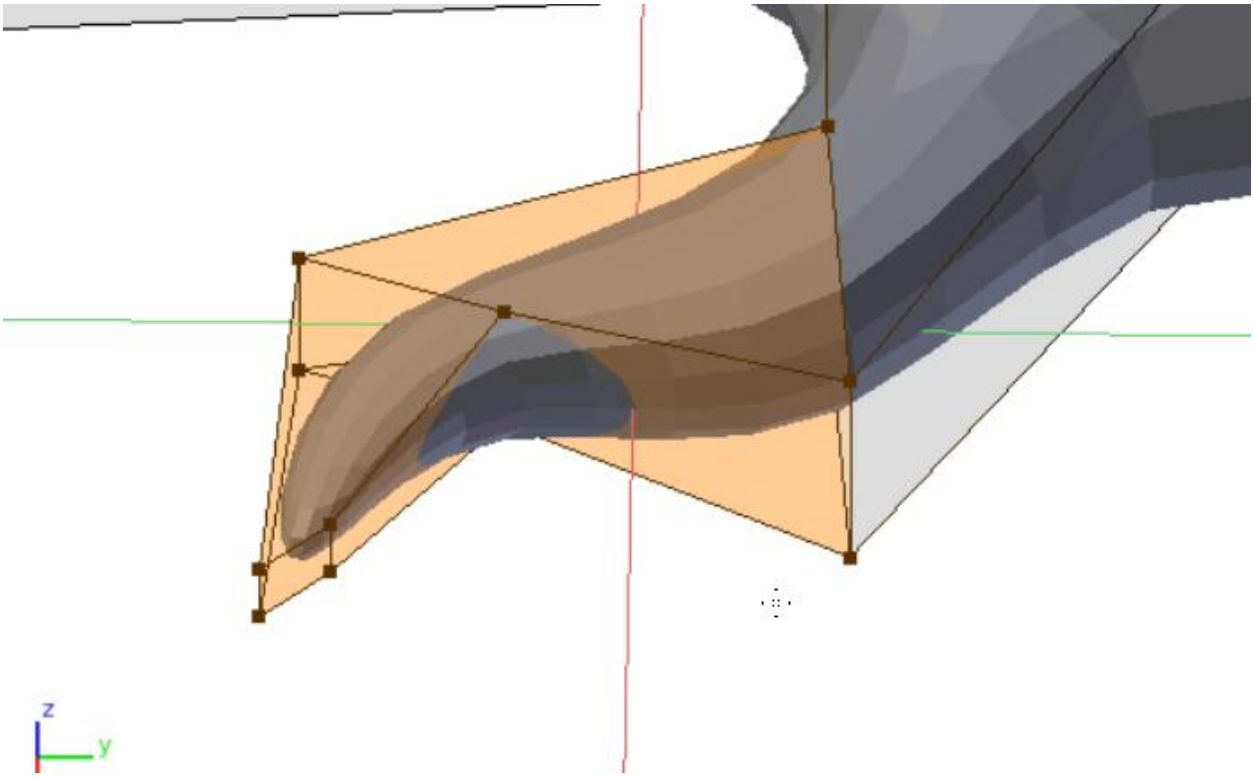


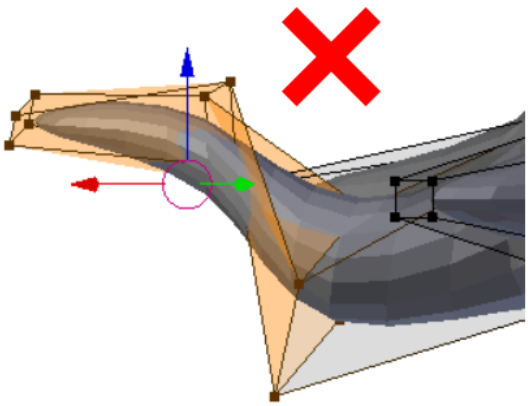

z
y

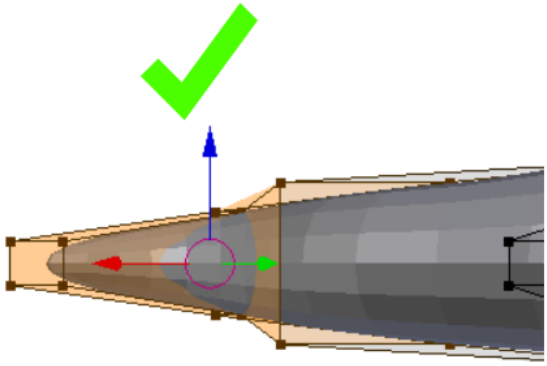

Loop Cut and Slide
Loop Cut
Number of Cuts
2
Smoothness
0.000
Falloff
Inverse Square
Edge Slide
Factor
View
Select
Add
Mesh
Edit Mode
z
y

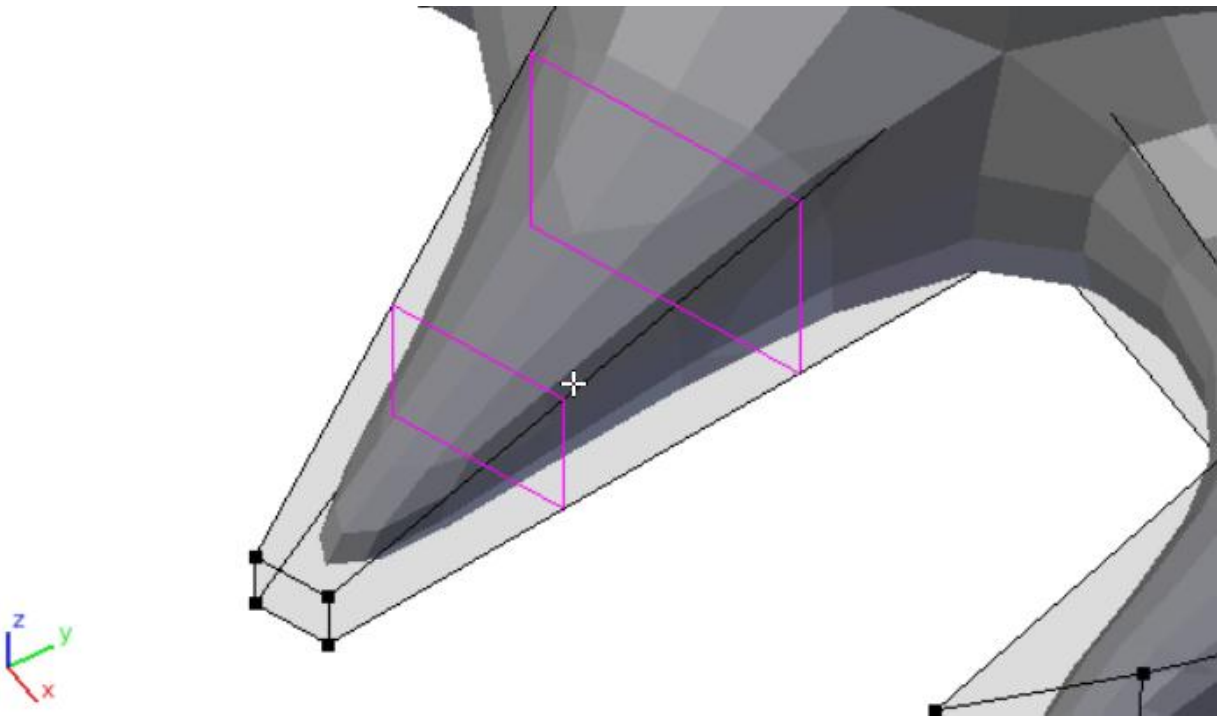

z
y

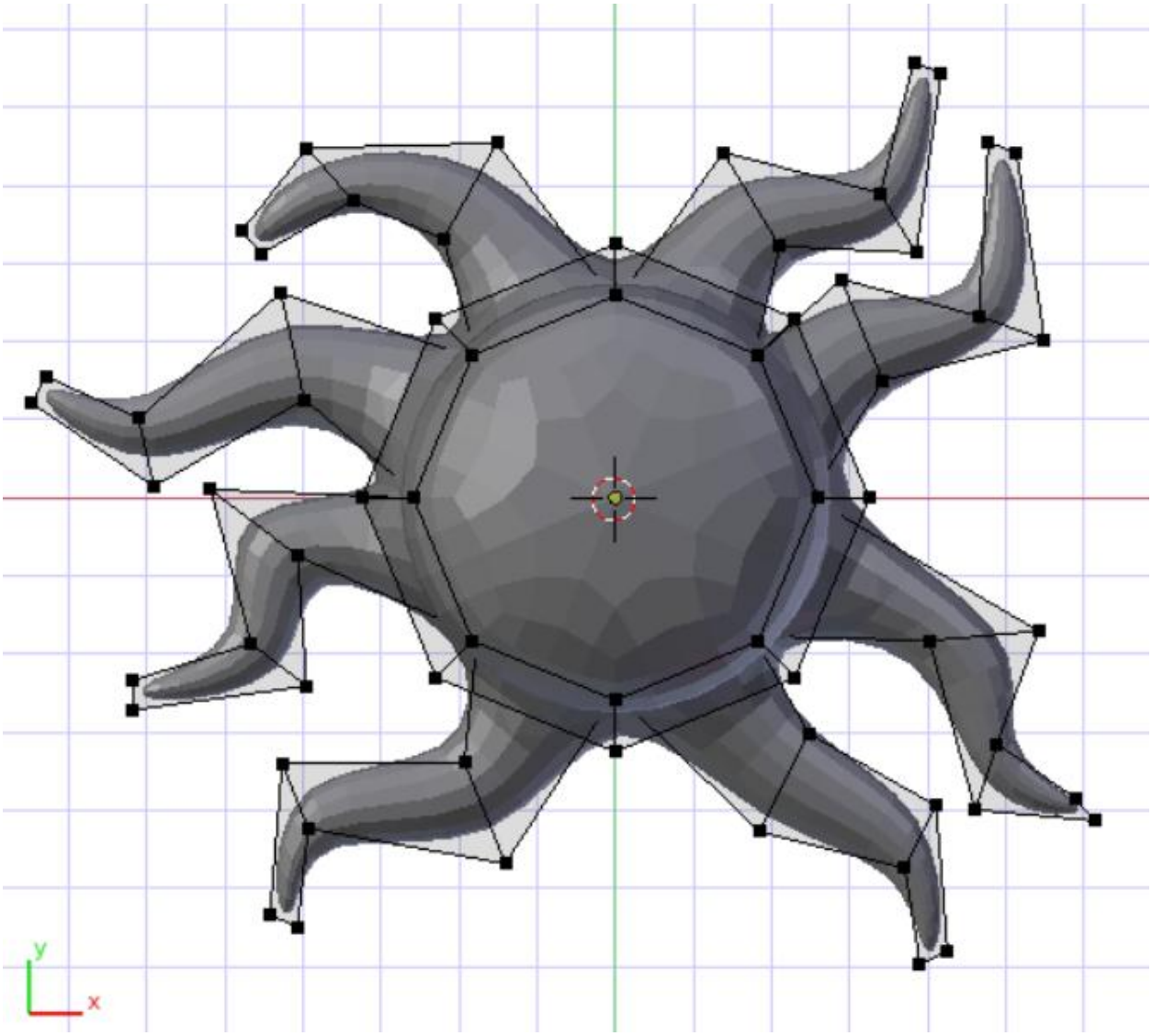

y

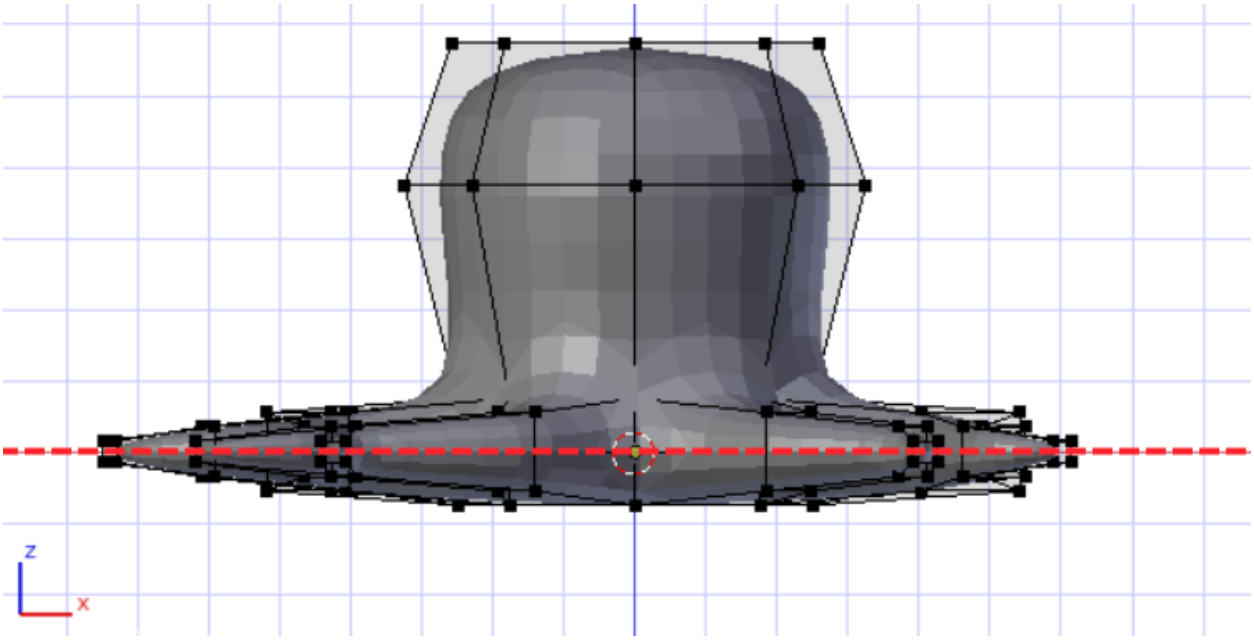

z
y

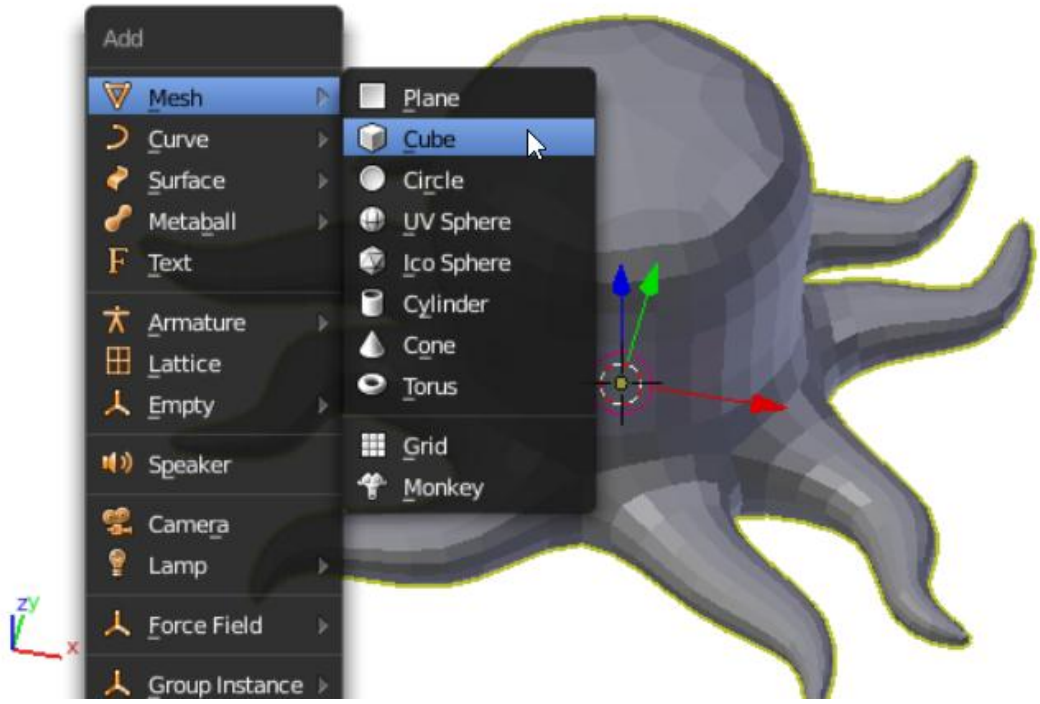

z
x
y

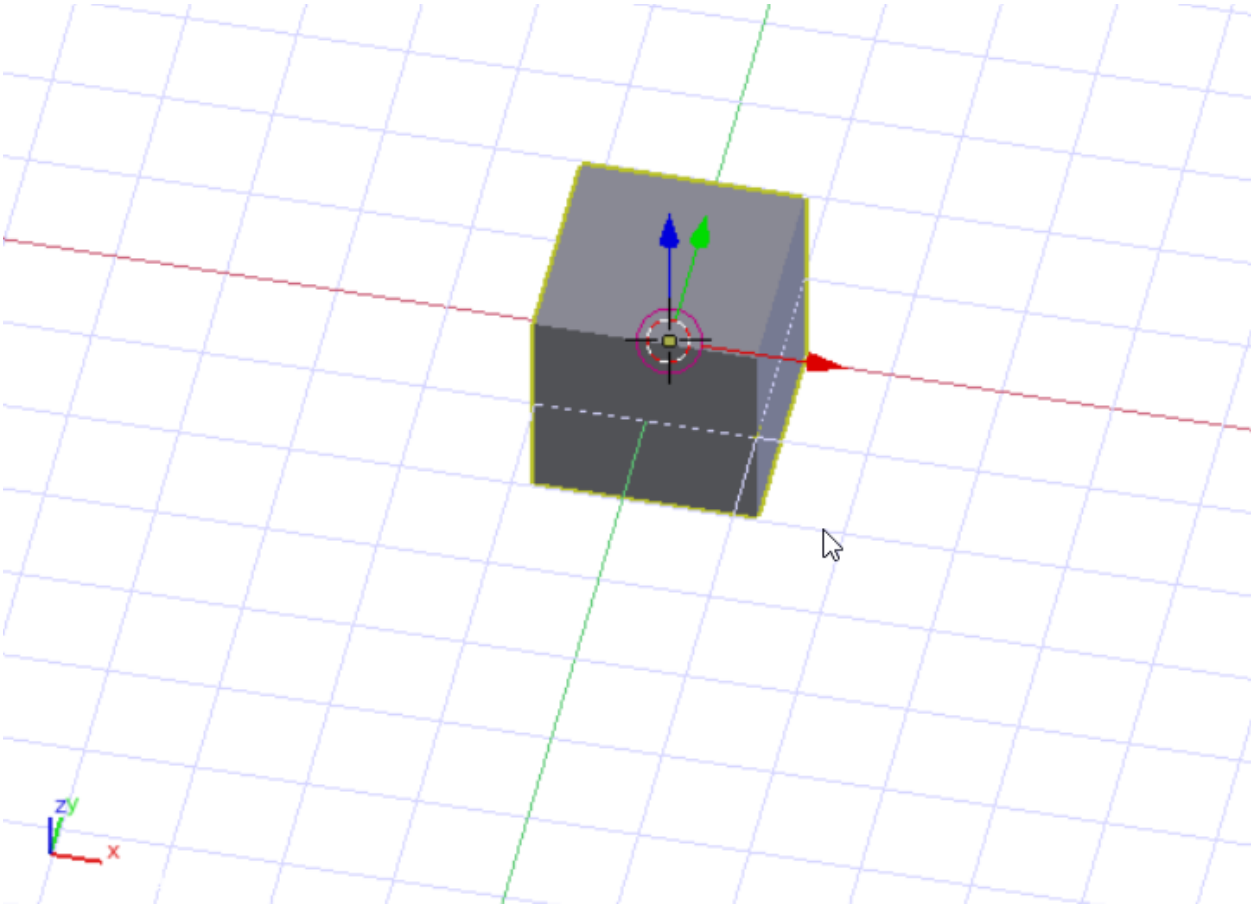

z
x
y

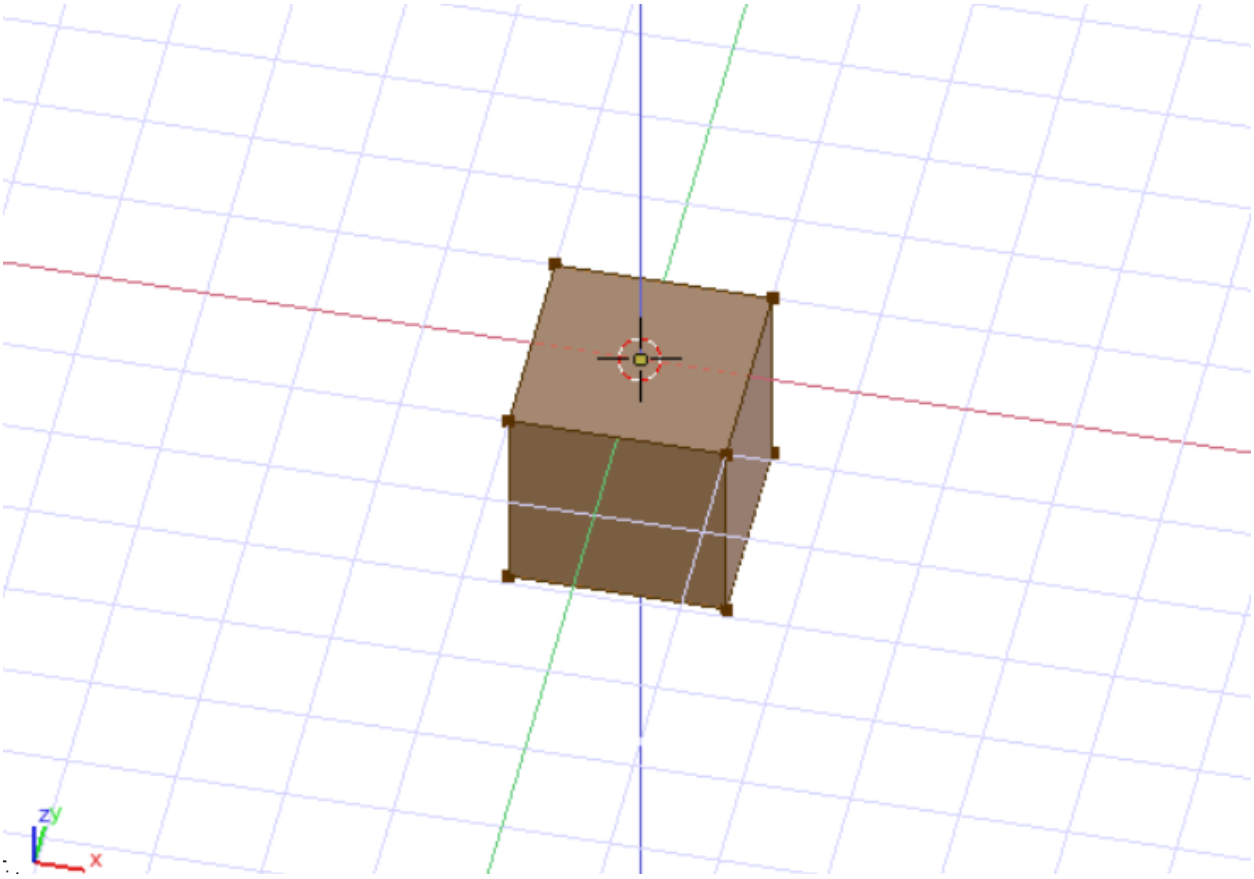

z
y
x

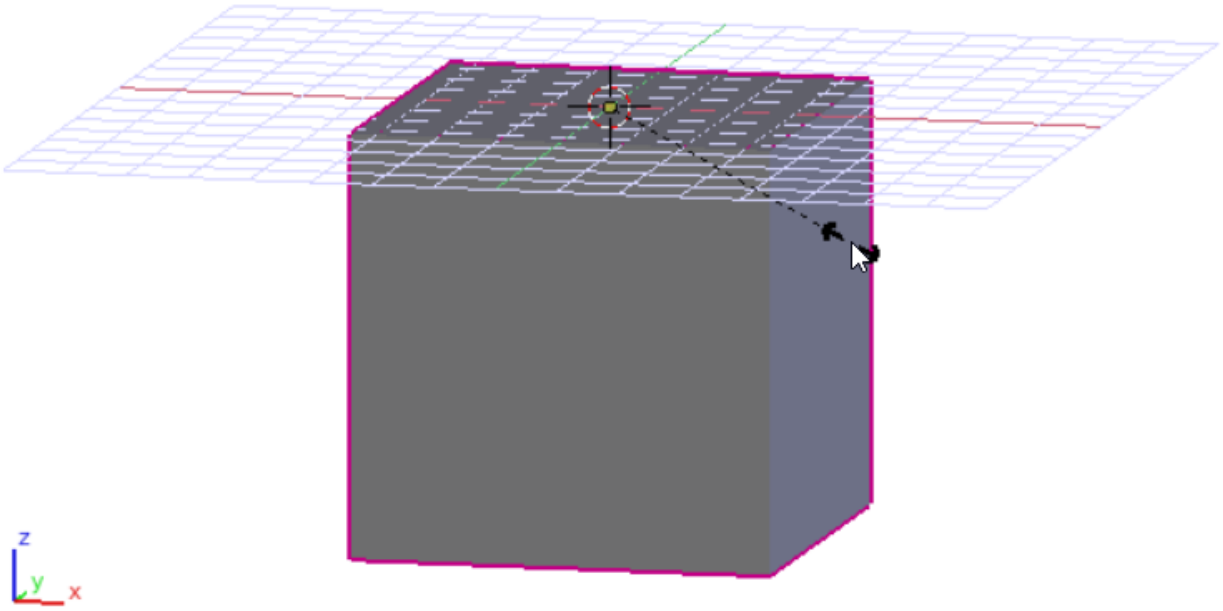

y
x

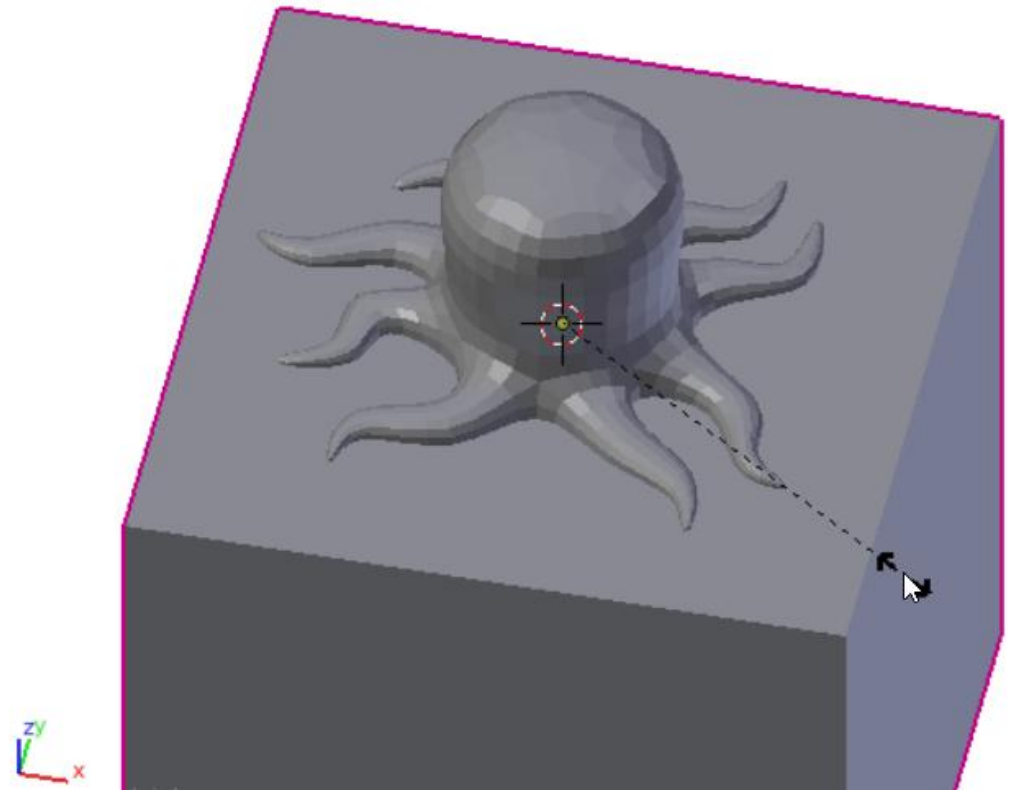

Z
X

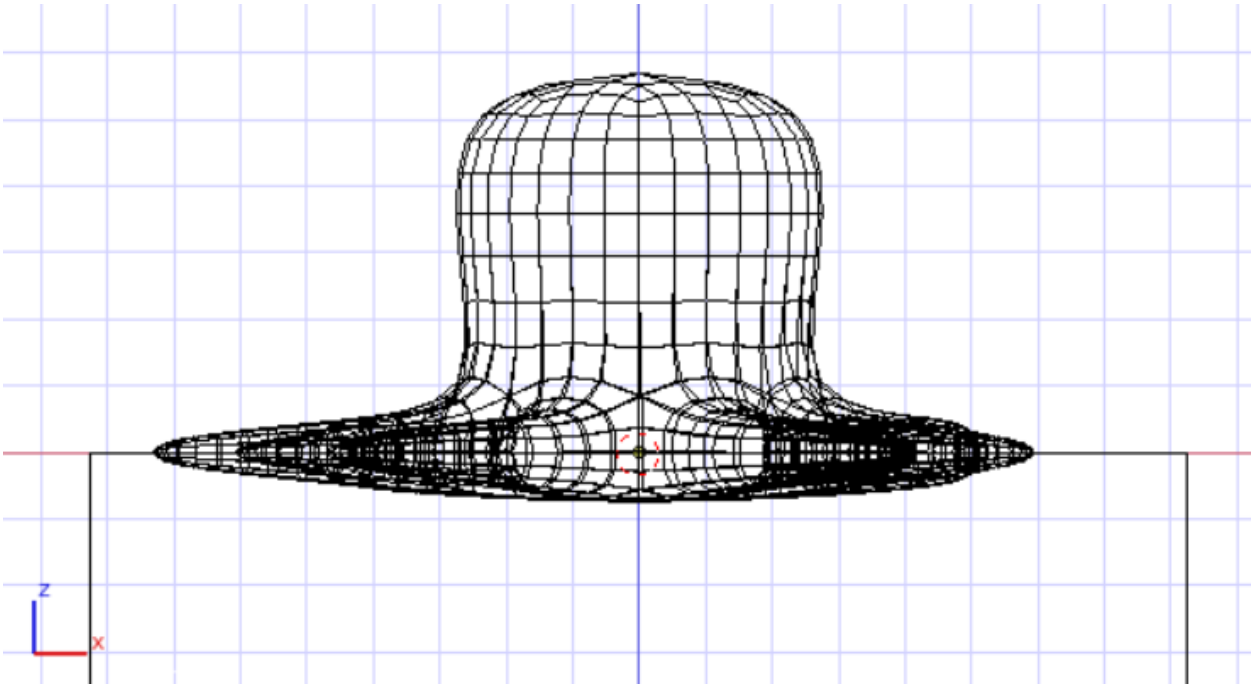

Add
Mesh
Curve
Surface
Metaball
Text
Armature
Lattice
Empty
Speaker
Camera
Lamp
Force Field
Group Instance
Plane
Cube
Circle
UV Sphere
Ico Sphere
Cylinder
Cone
Torus
Grid
Monkey
ZY
X

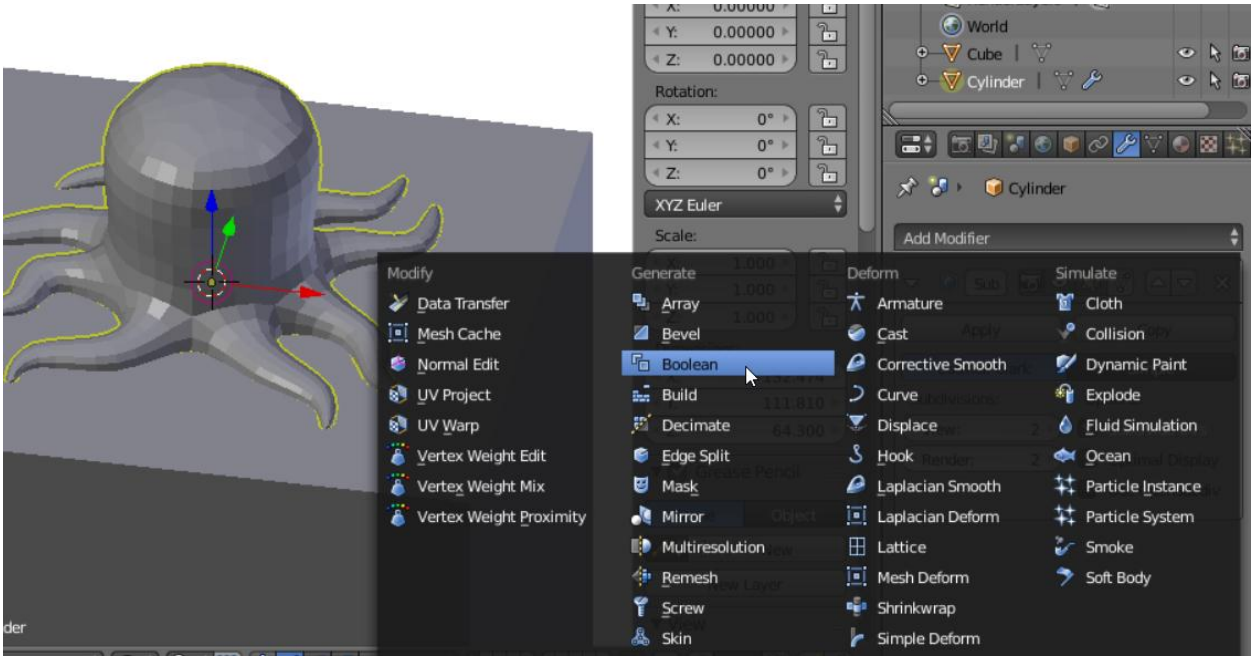

z
y
x

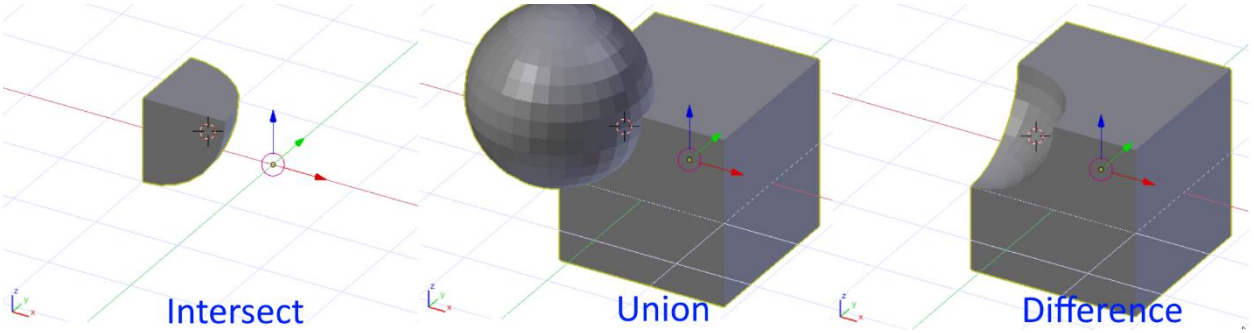

z
y
x

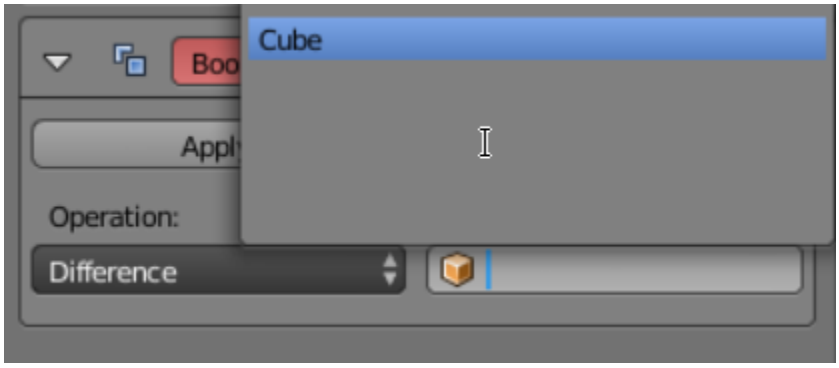

z
y
x

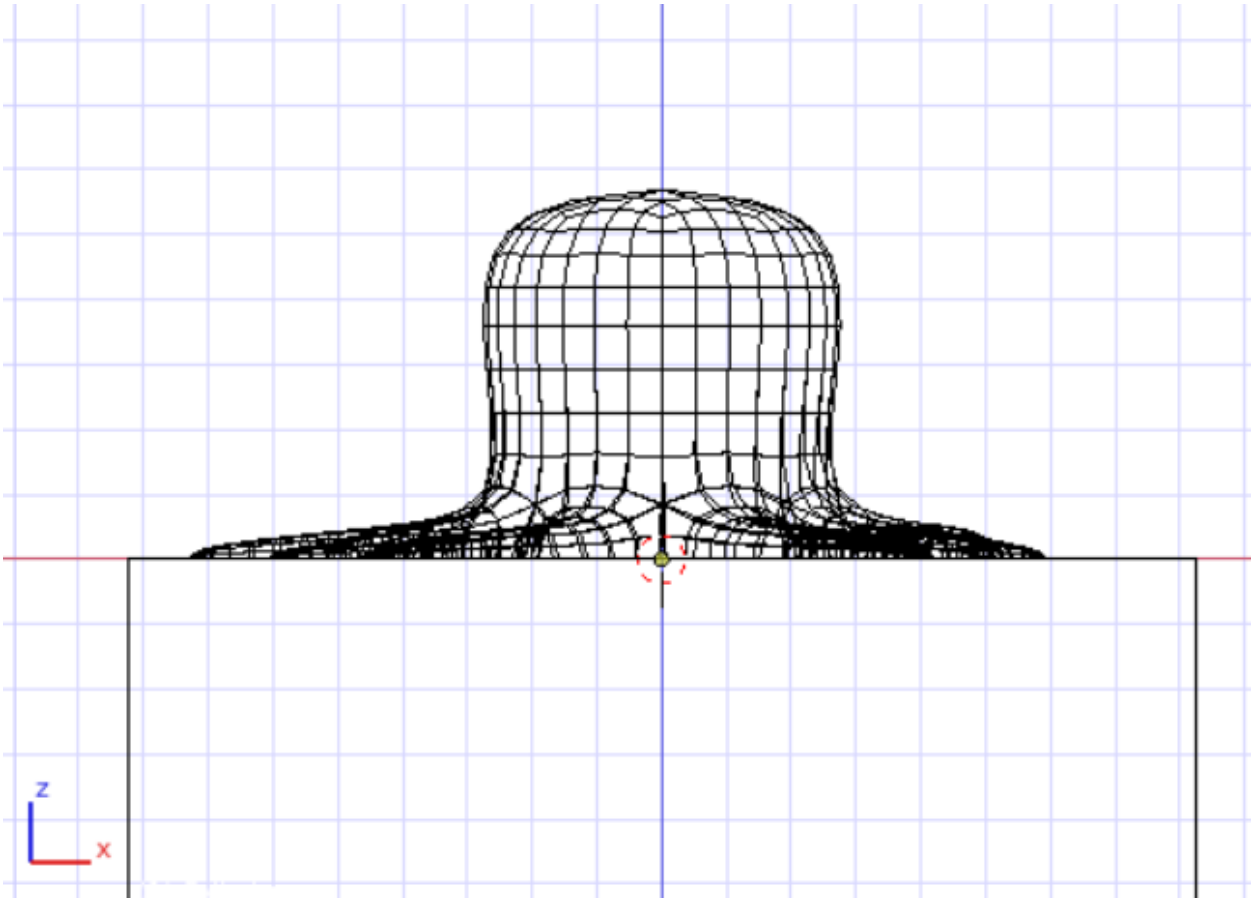

Z
Y
X

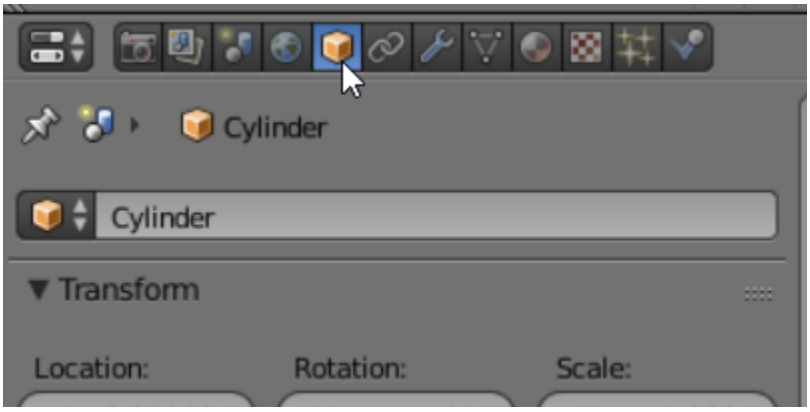

Z
X

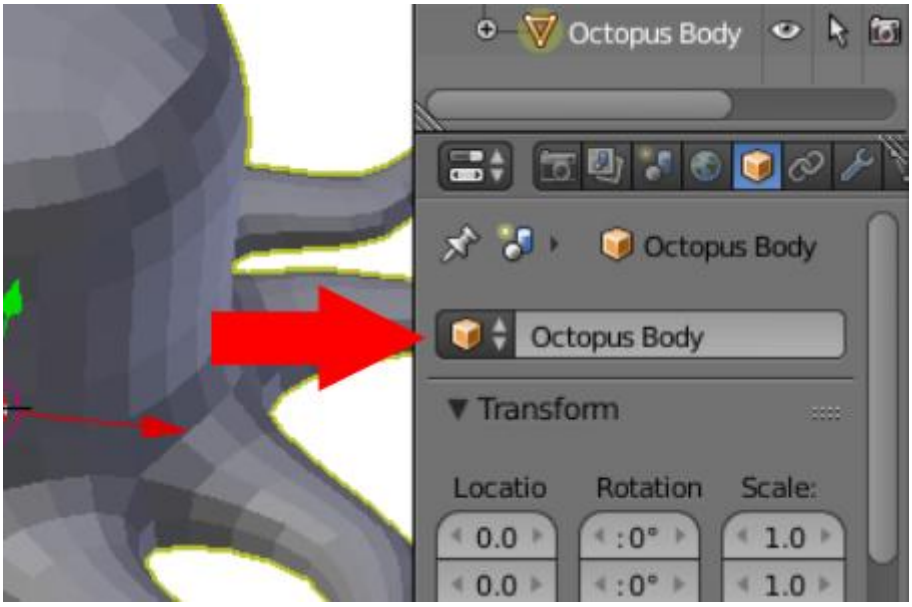

Y: 0.00000
Z: 0.00000
Rotation:
X: 0°
Y: 0°
Z: 0°
XYZ Euler
Scale:
World
Cube
Cylinder
Add Modifier
Modify
Data Transfer
Mesh Cache
Normal Edit
UV Project
UV Warp
Vertex Weight Edit
Vertex Weight Mix
Vertex Weight Proximity
Generate
Array
Bevel
Boolean
Build
Decimate
Edge Split
Mask
Mirror
Multiresolution
Remesh
Screw
Skin
Deform
Armature
Cast
Corrective Smooth
Curve
Displace
Hook
Laplacian Smooth
Laplacian Deform
Lattice
Mesh Deform
Shrinkwrap
Simple Deform
Simulate
Cloth
Collision
Dynamic Paint
Explode
Fluid Simulation
Ocean
Particle Instance
Particle System
Smoke
Soft Body

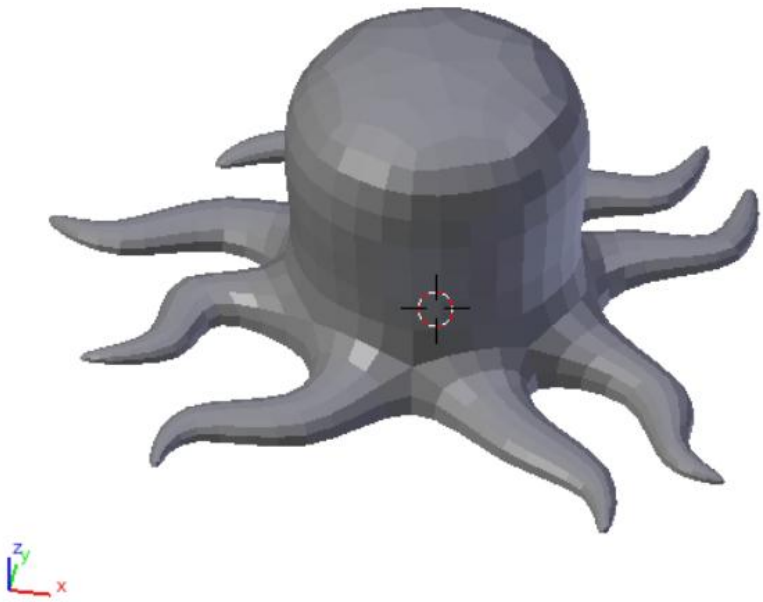

Intersect
Union
Difference


Cube
Operation:
Difference

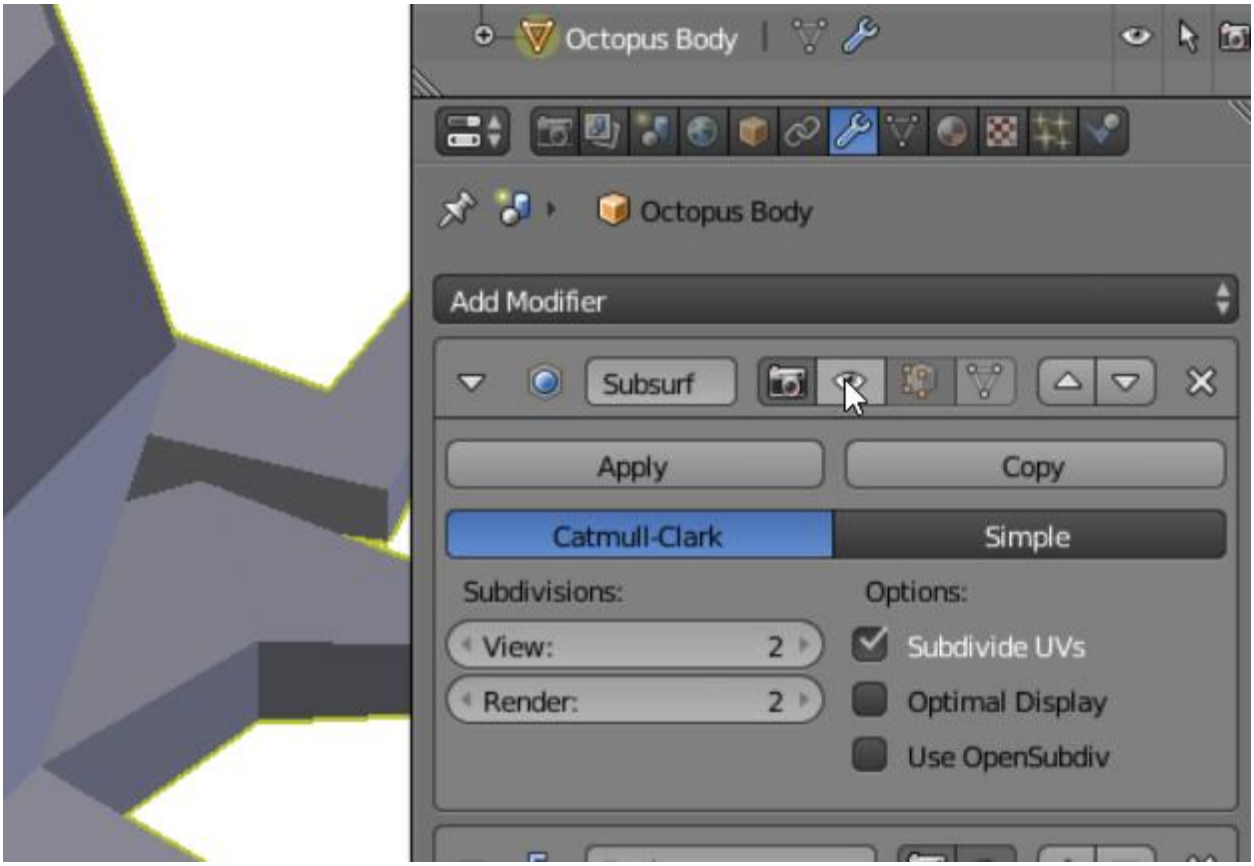

Z
X

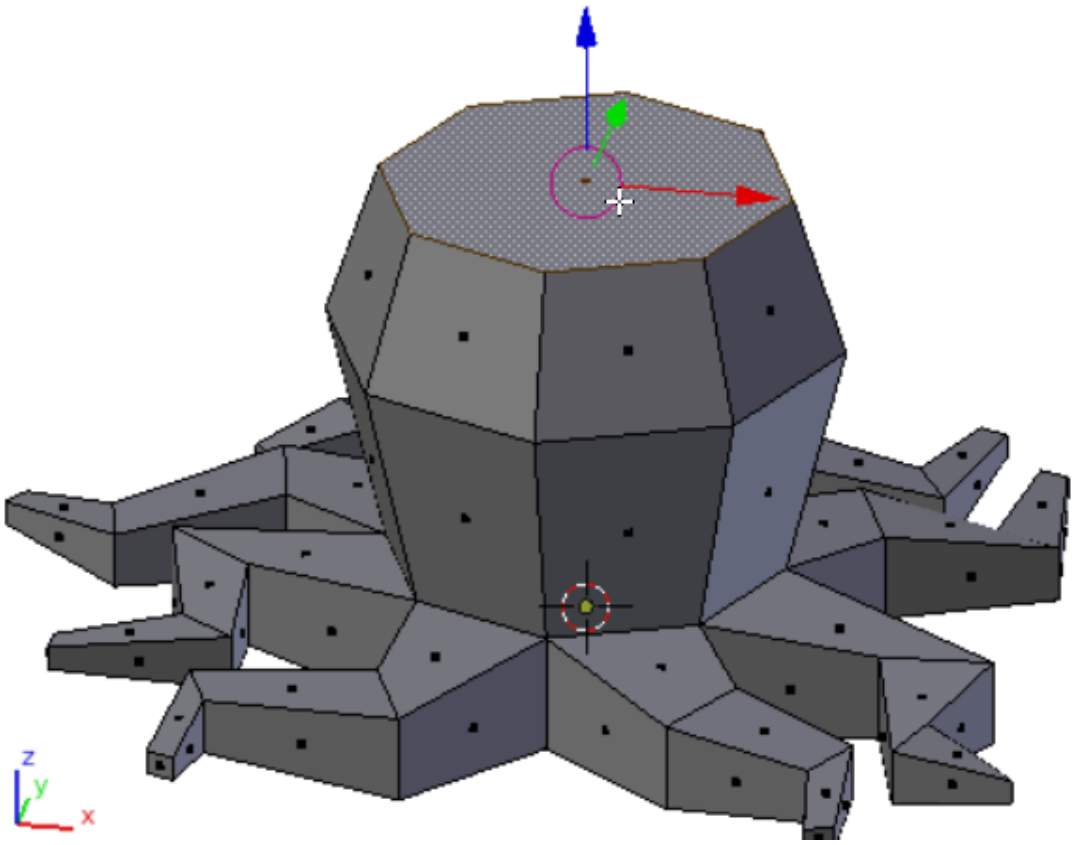

Cylinder
Cylinder
▼ Transform
Location:
Rotation:
Scale:

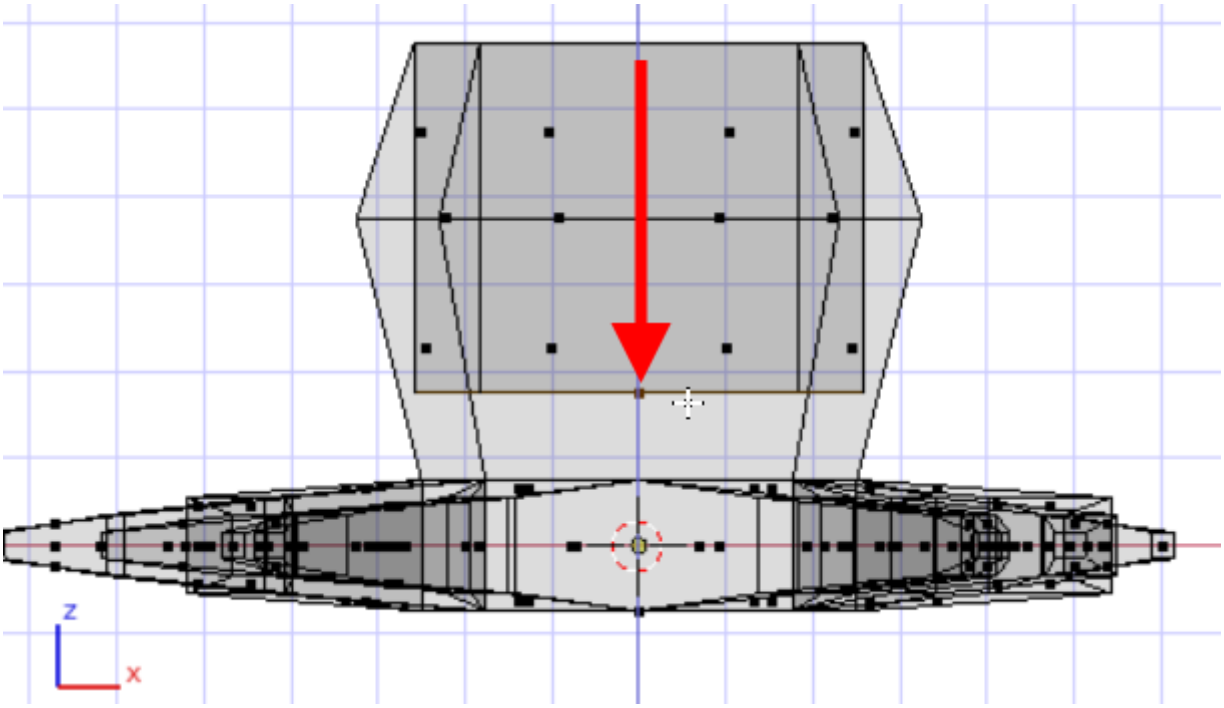

Octopus Body
Octopus Body
Octopus Body
▼ Transform
Locatio
Rotation
Scale:
0.0
:0°
1.0
0.0
:0°
1.0

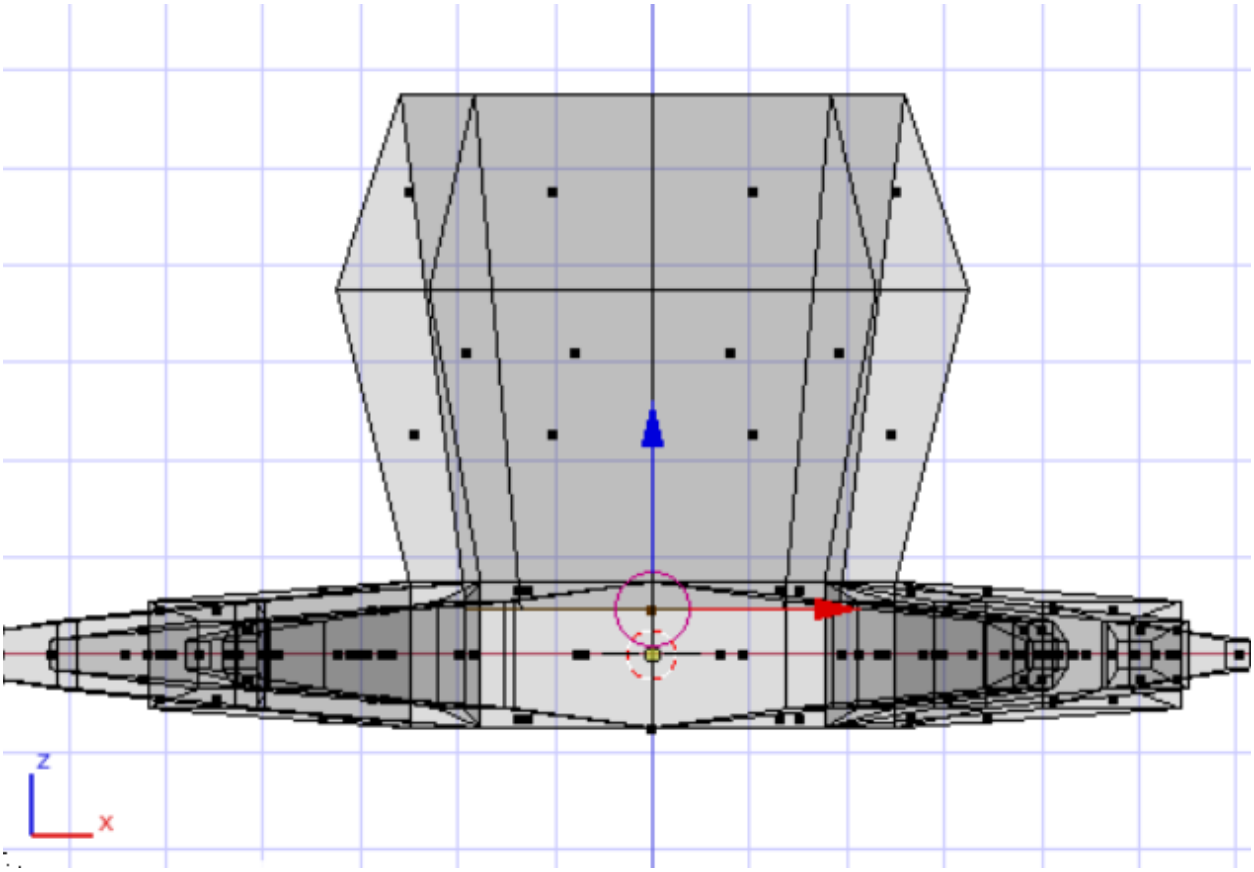


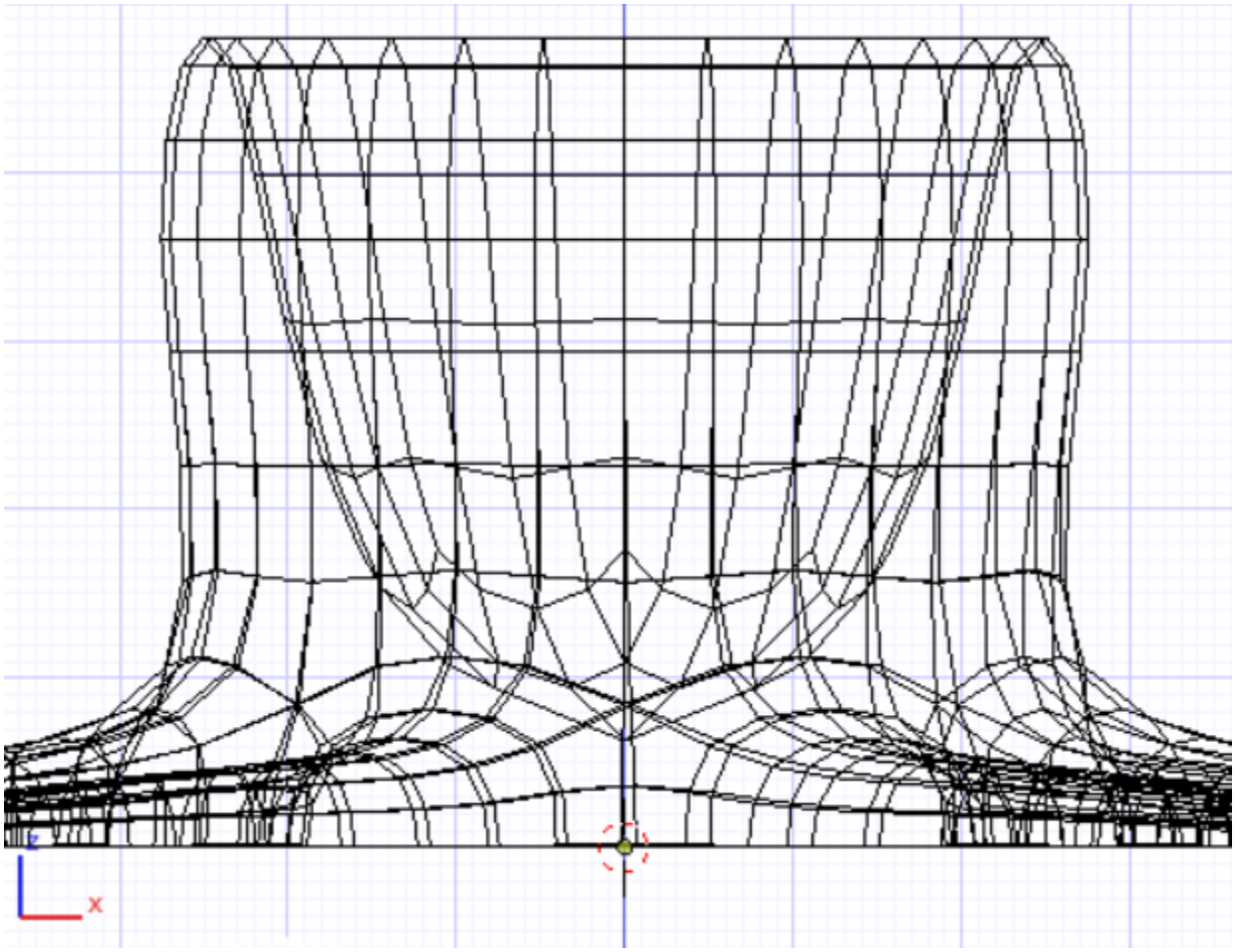
View
Search
All Scene
Scene
RenderLayers
World
Floor
Octopus Body
Floor
Floor
▼ Transform
Locatio
Rotation
Scale:
0.0
:0°
82.
0.0
:0°
82.
0.0
:0°
82.
Rotation
XYZ Euler
▶ Delta Transform

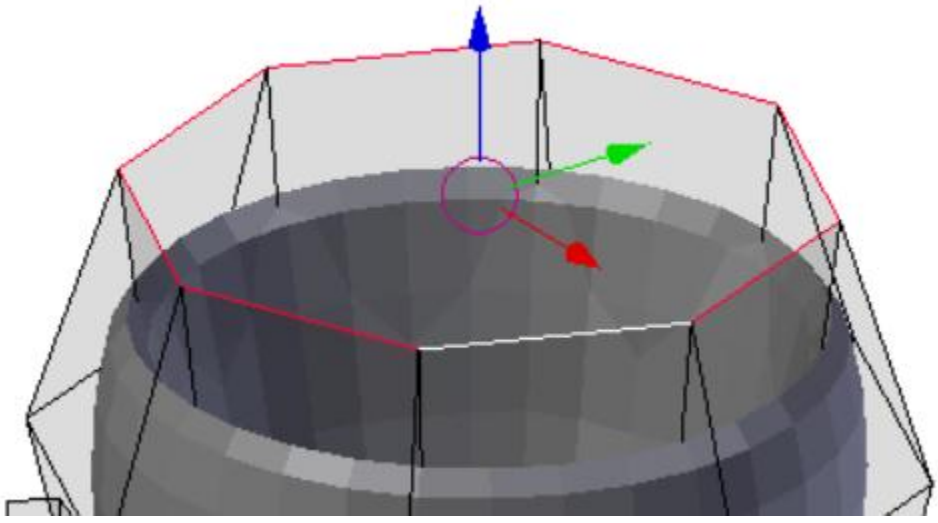

Octopus Body
Octopus Body
Add Modifier
Subsurf
Apply
Copy
Catmull-Clark
Simple
Subdivisions:
View: 2
Render: 2
Options:
Subdivide UVs
Optimal Display
Use OpenSubdiv

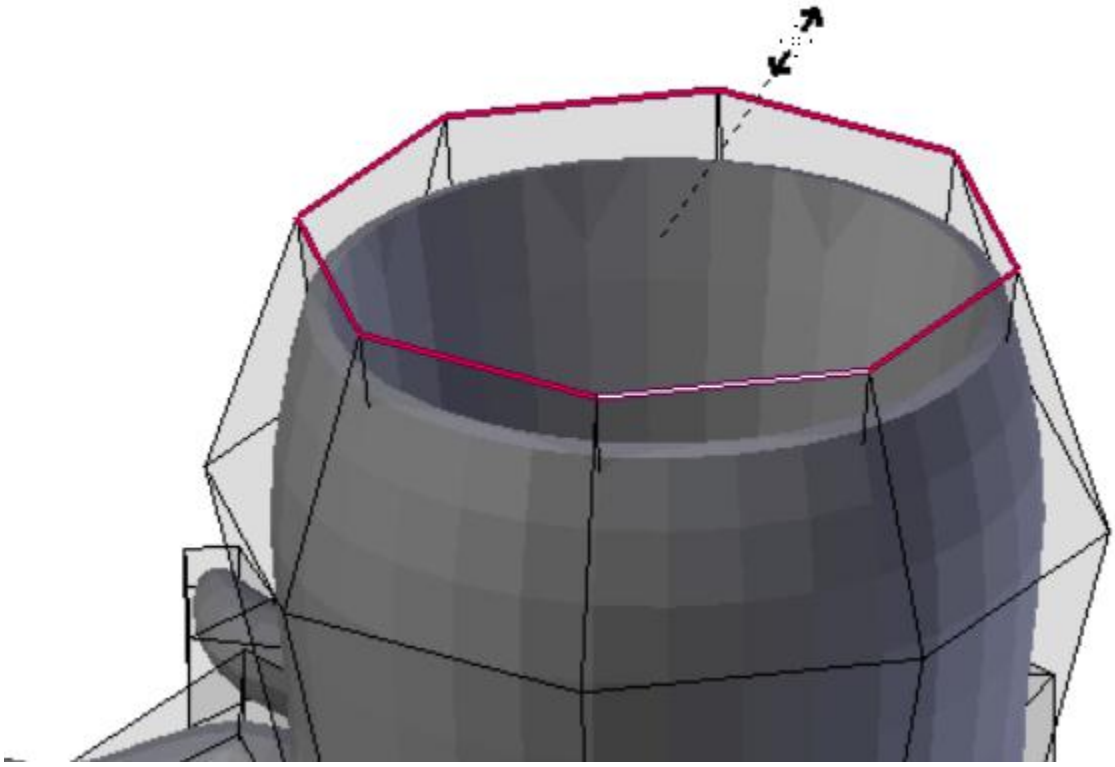

z
y
x

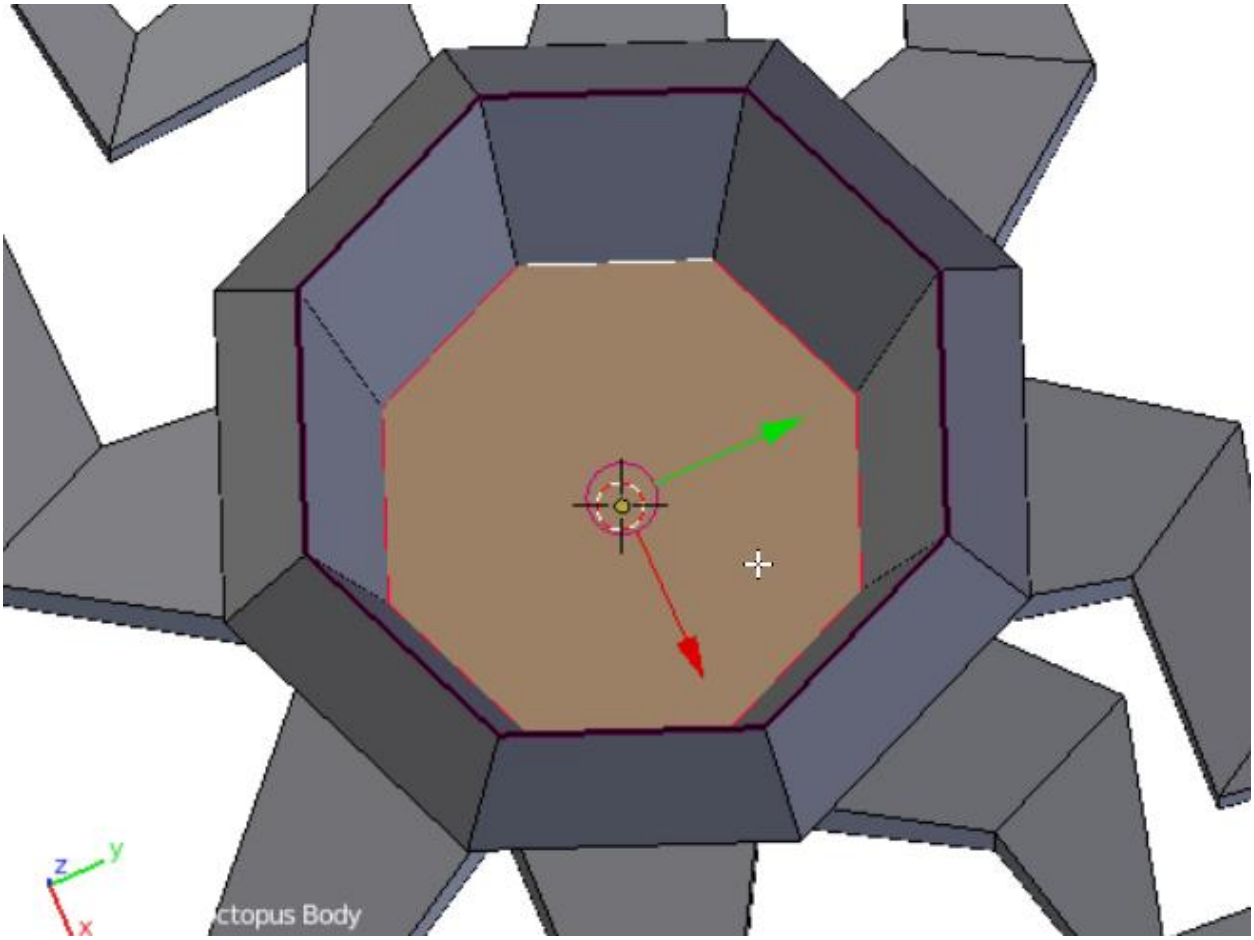

z
x

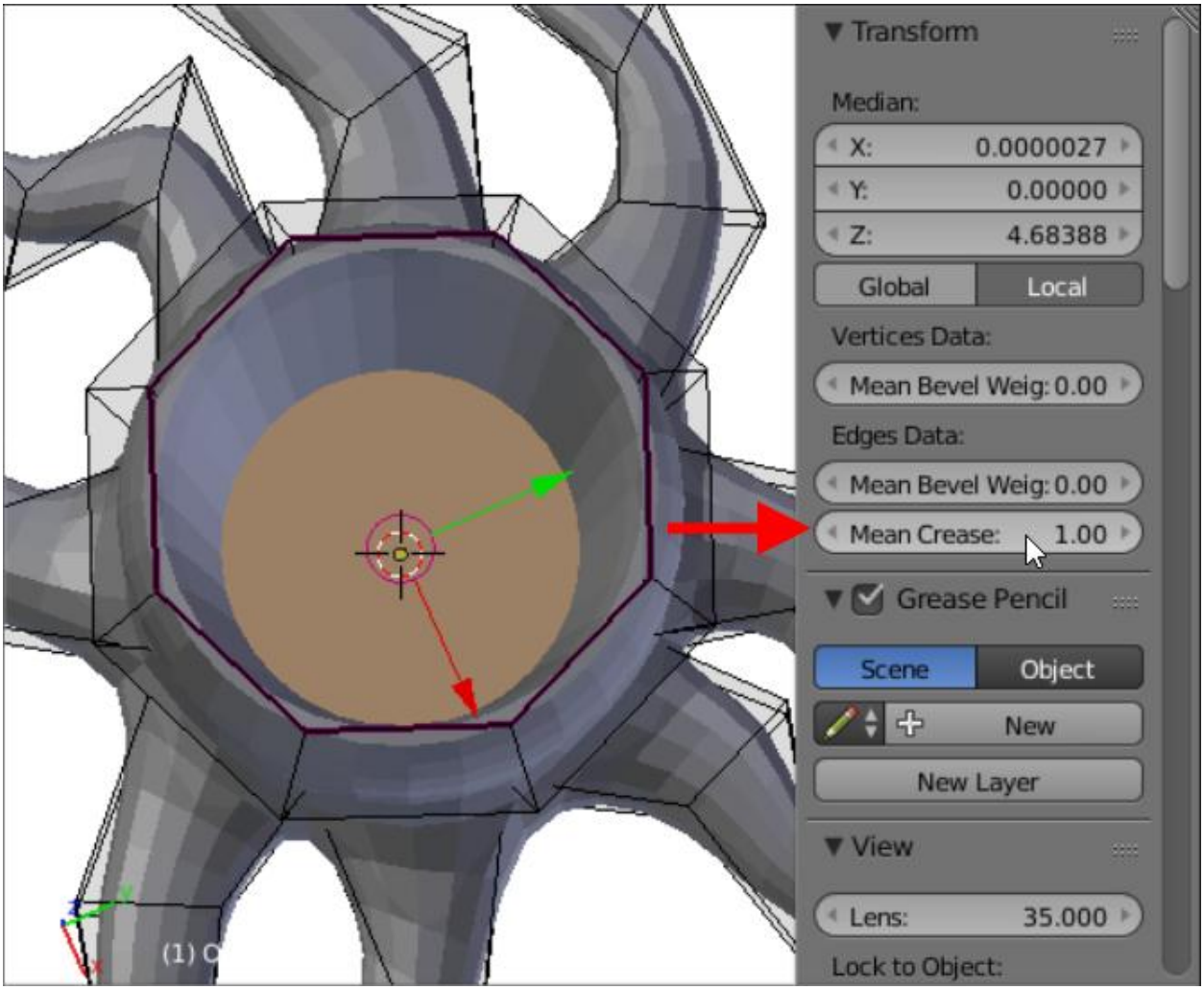

Z
X

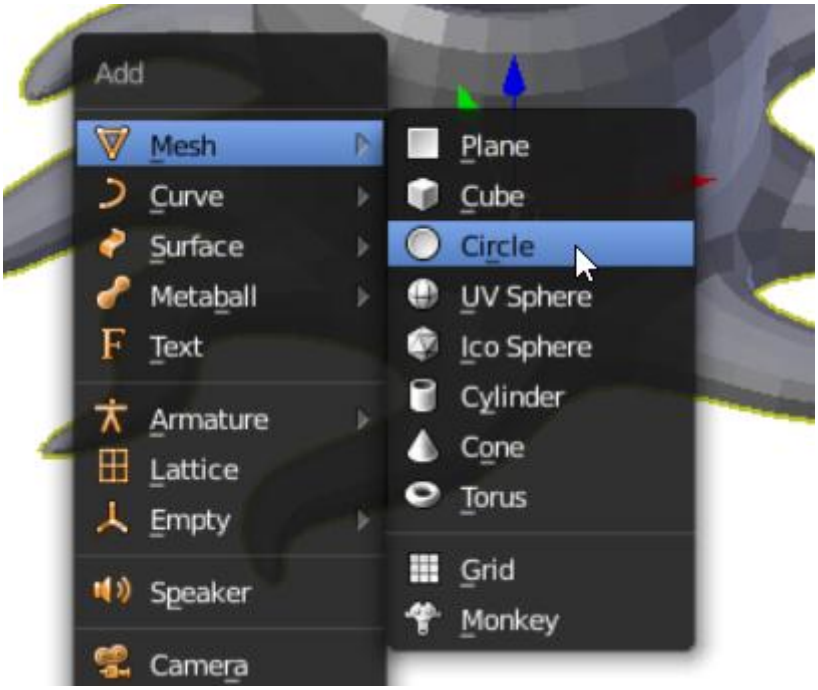

z
x

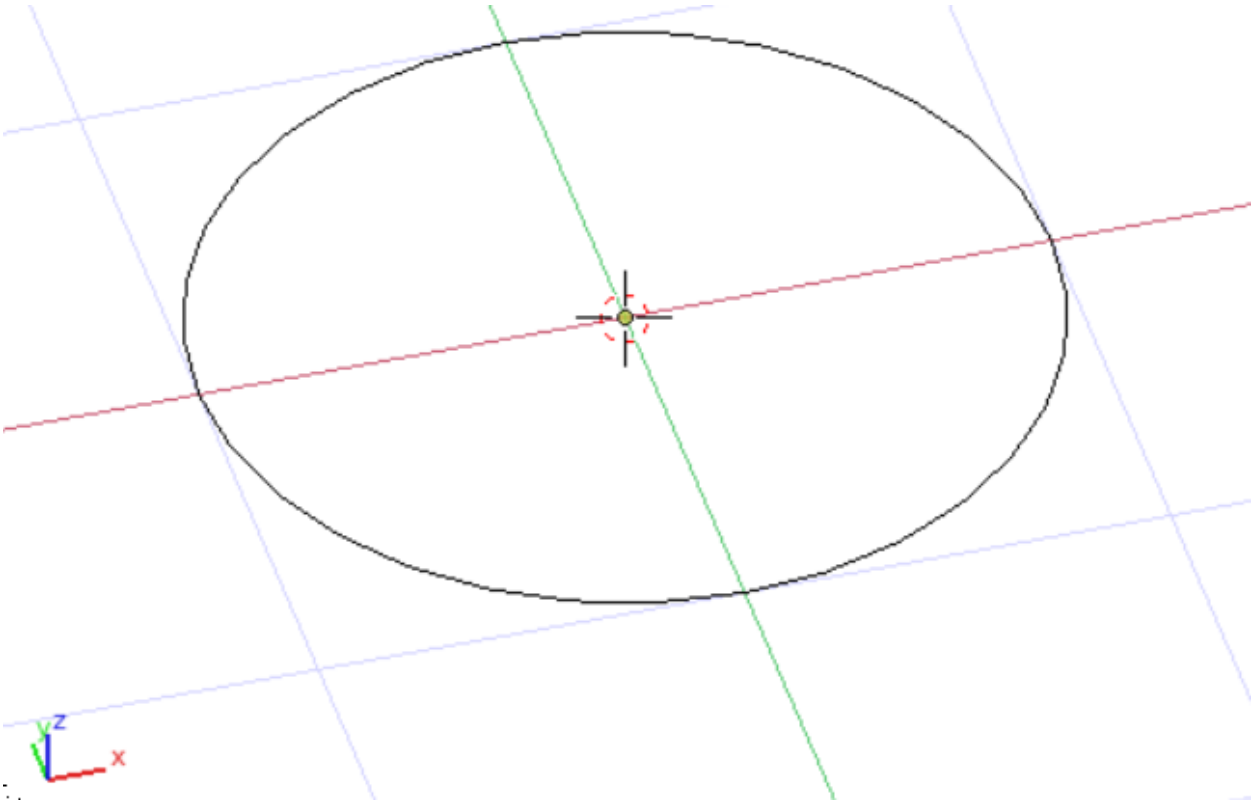


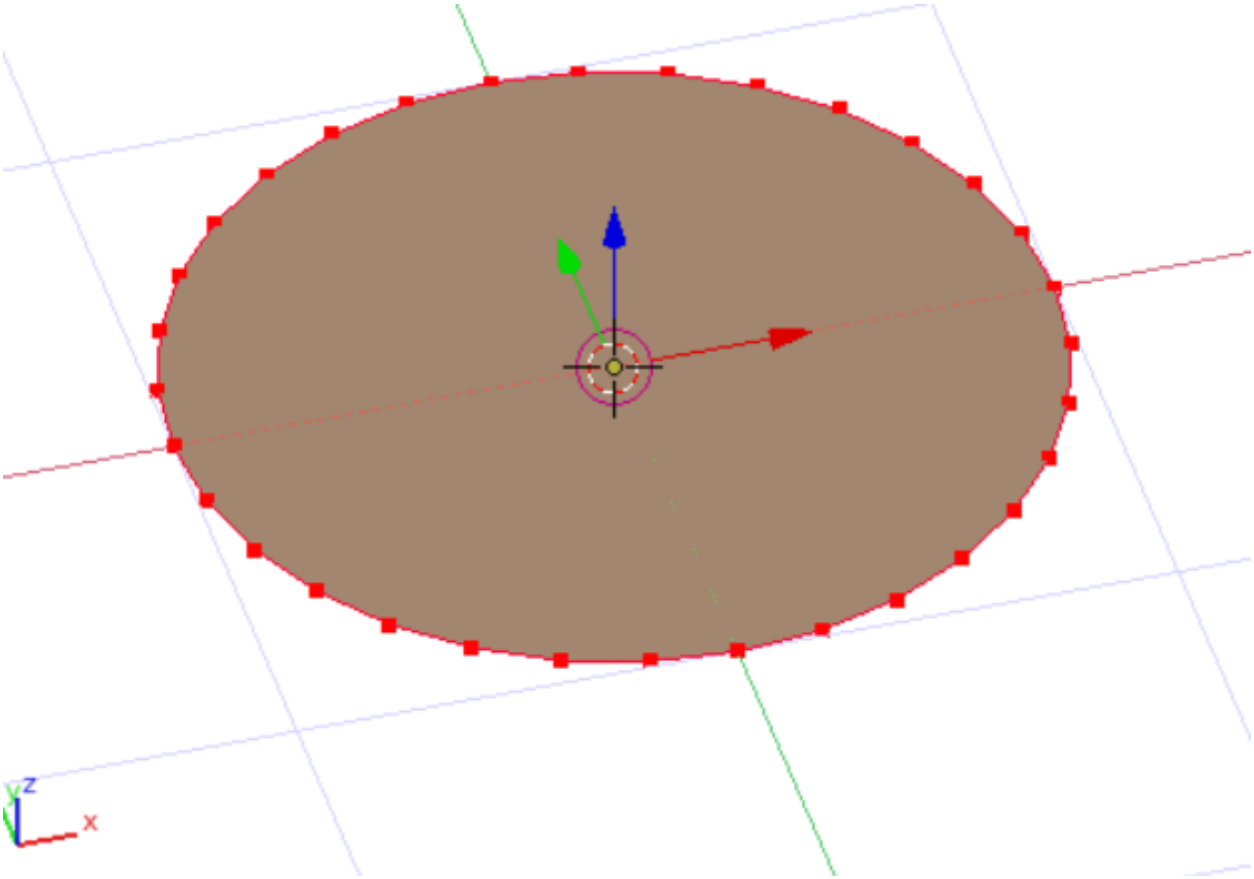


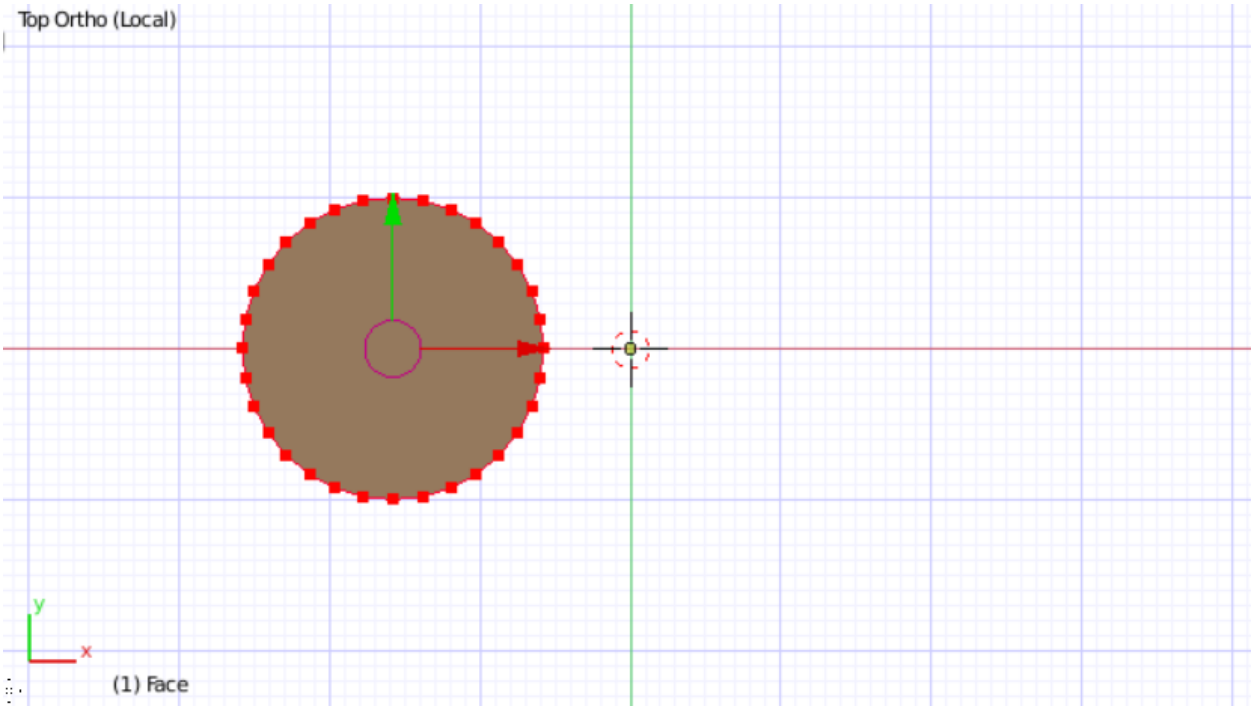

z
y
x
ctopus Body

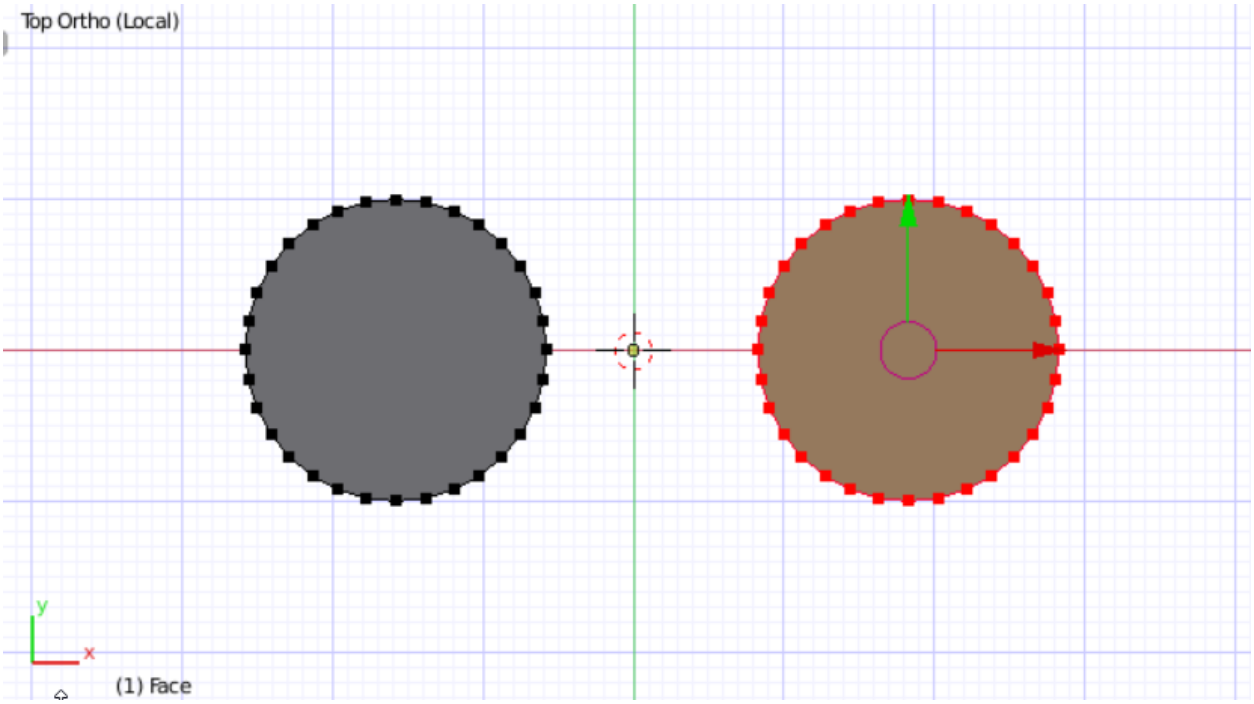

Transform
Median:
X: 0.0000027
Y: 0.00000
Z: 4.68388
Global
Local
Vertices Data:
Mean Bevel Weig: 0.00
Edges Data:
Mean Bevel Weig: 0.00
Mean Crease: 1.00
Grease Pencil
Scene
Object
New
New Layer
View
Lens: 35.000
Lock to Object:

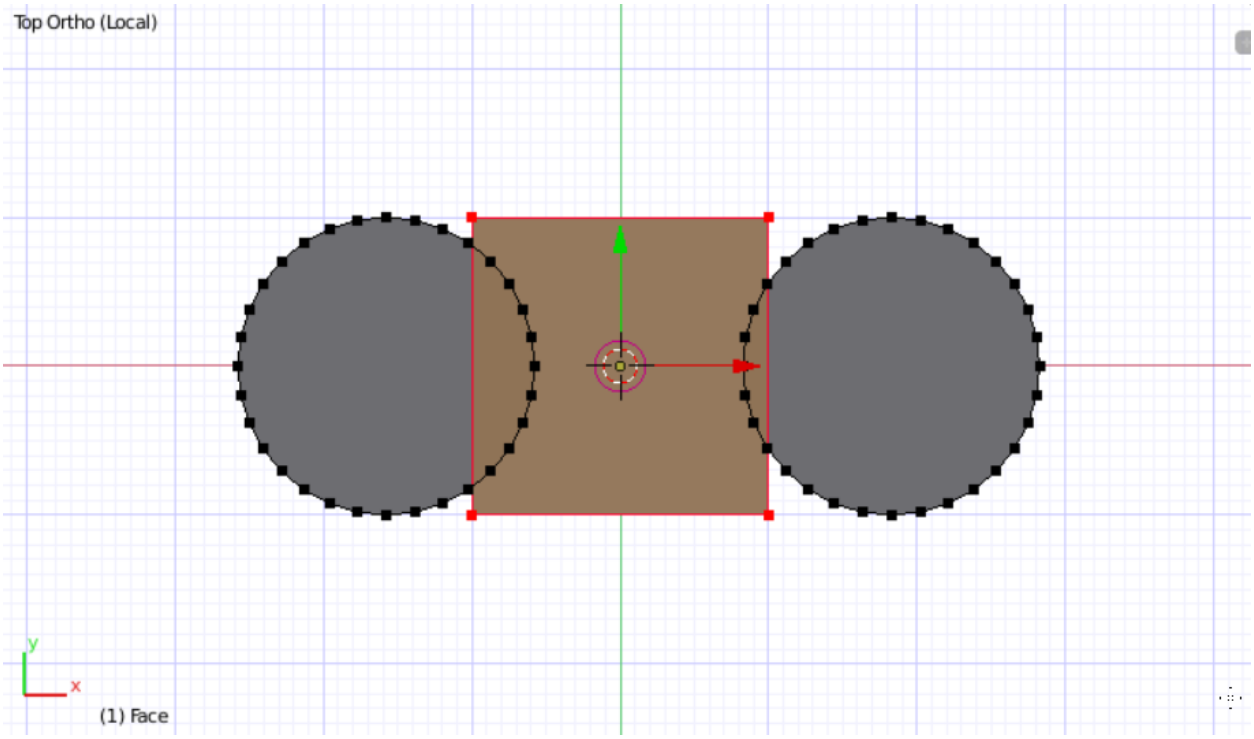

Add
Mesh
Curve
Surface
Metaball
Text
Armature
Lattice
Empty
Speaker
Camera
Plane
Cube
Circle
UV Sphere
Ico Sphere
Cylinder
Cone
Torus
Grid
Monkey

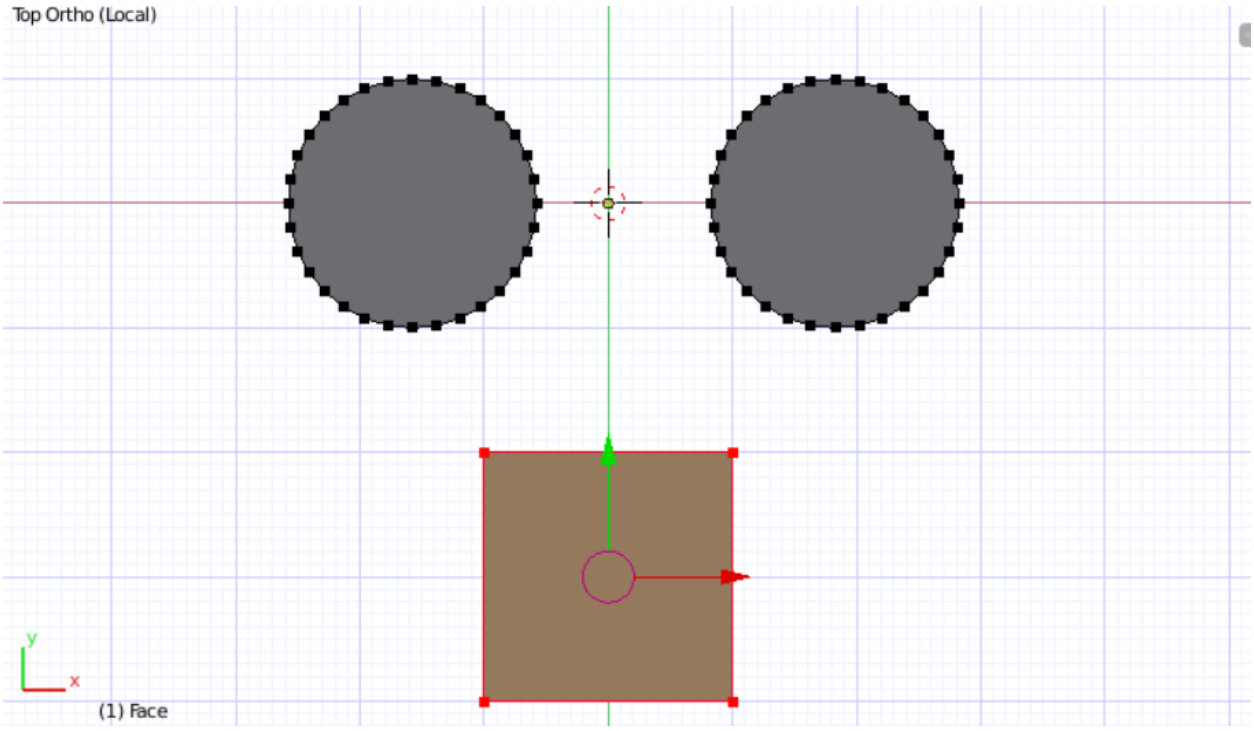

Z
X

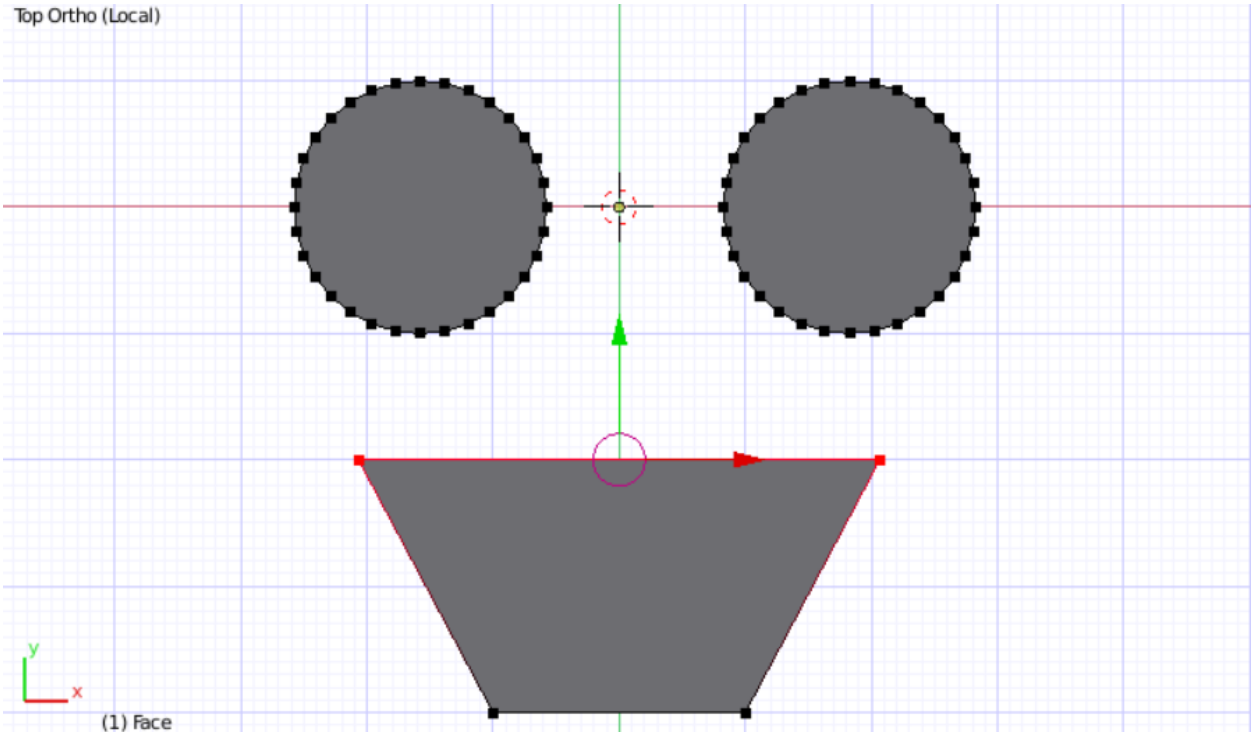

z
x

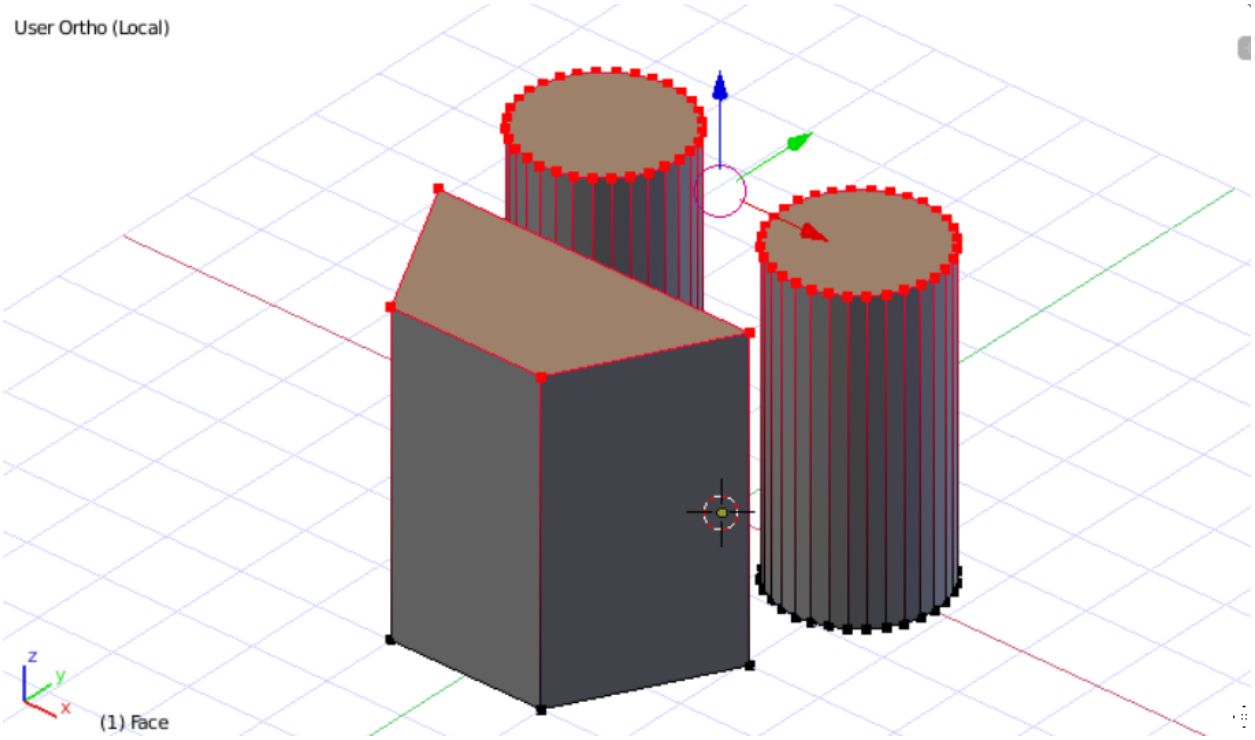

Top Ortho (Local)
y
x
(1) Face

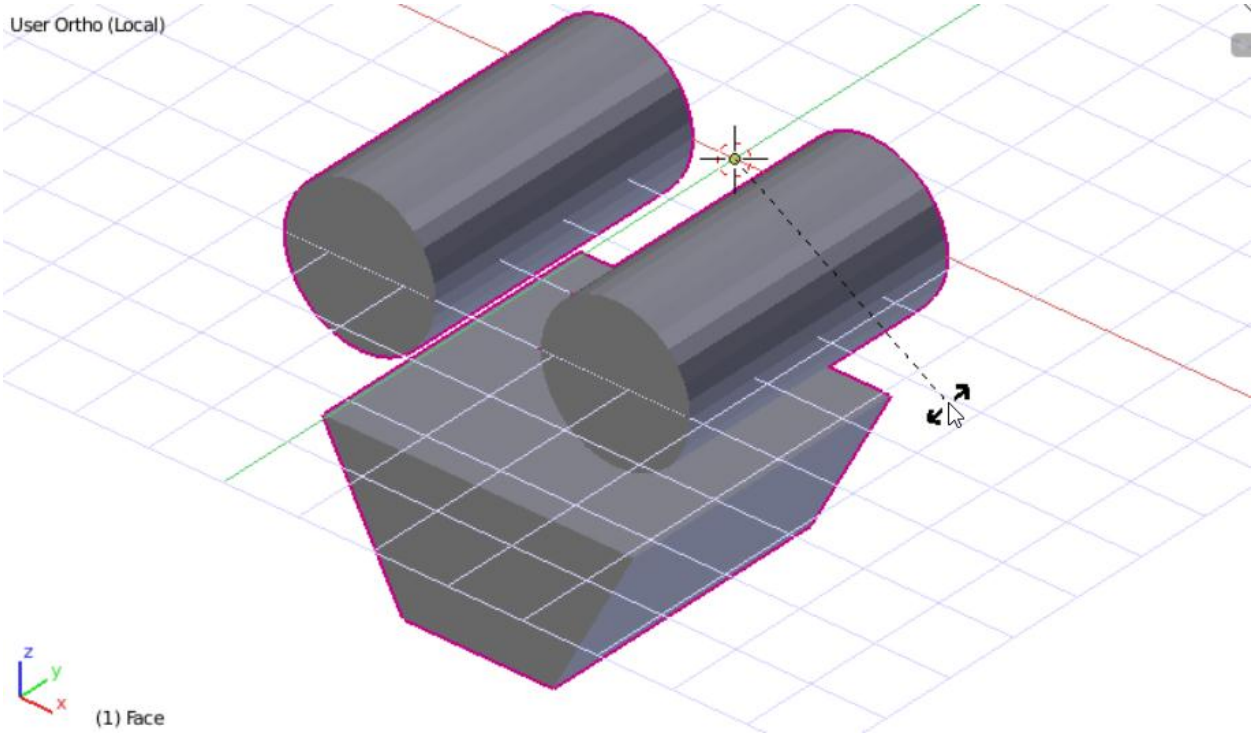

Top Ortho (Local)
y
x
(1) Face

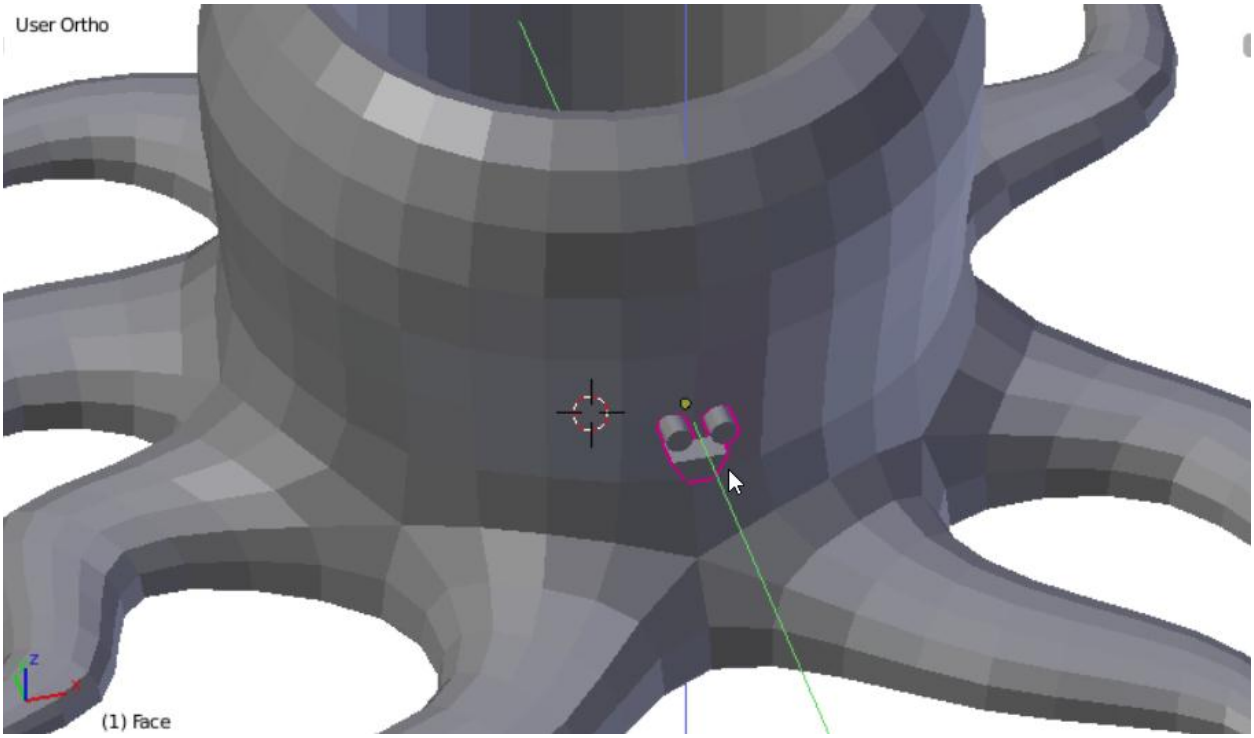

Top Ortho (Local)
y
x
(1) Face

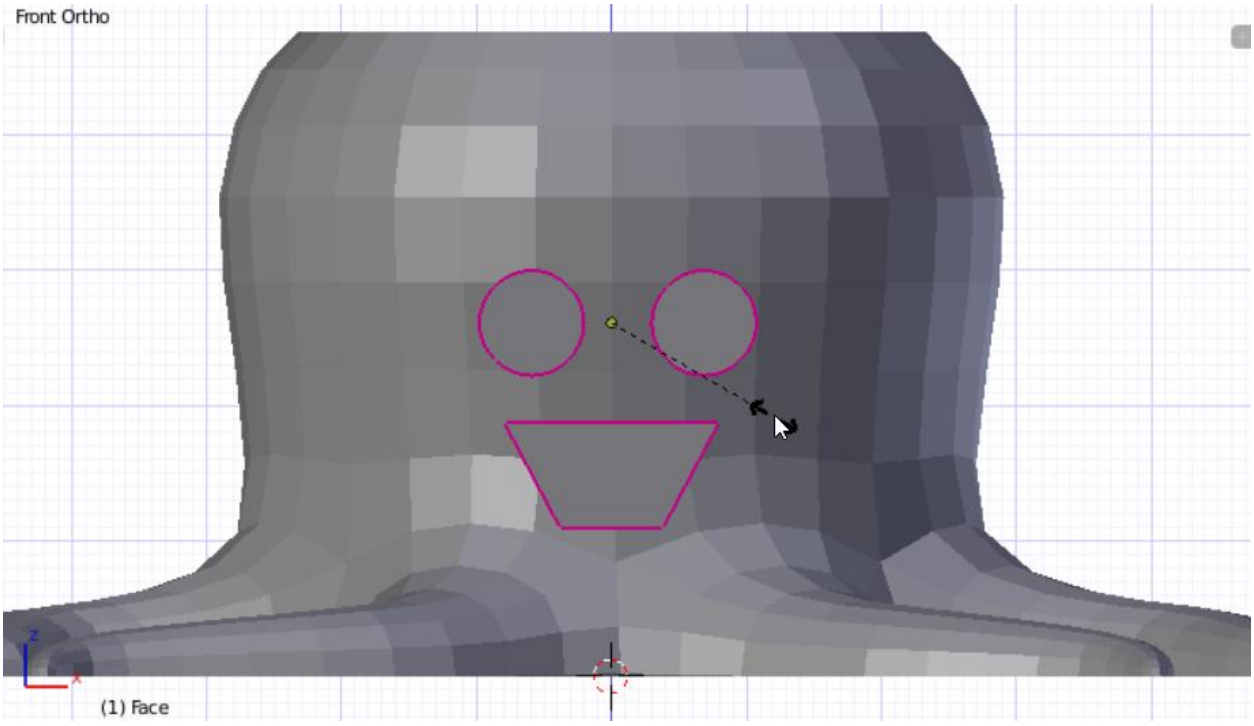

Top Ortho (Local)
y
x
(1) Face

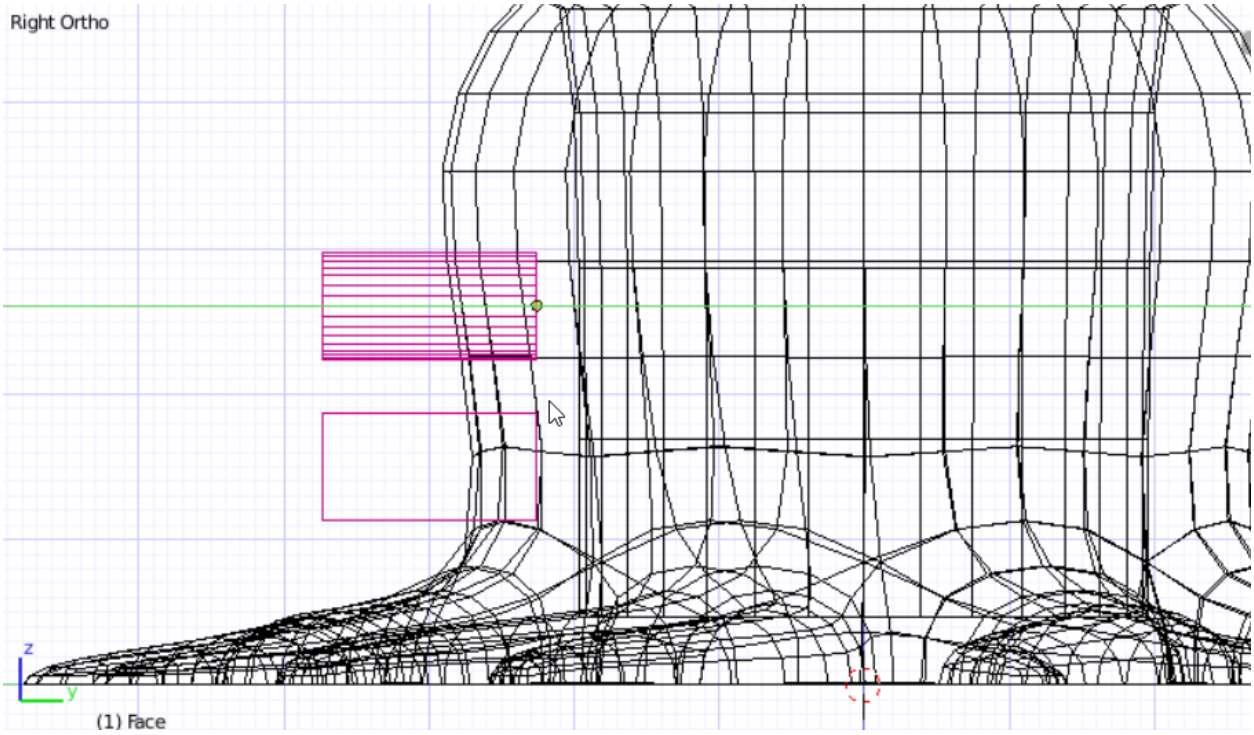

Top Ortho (Local)
y
x
(1) Face

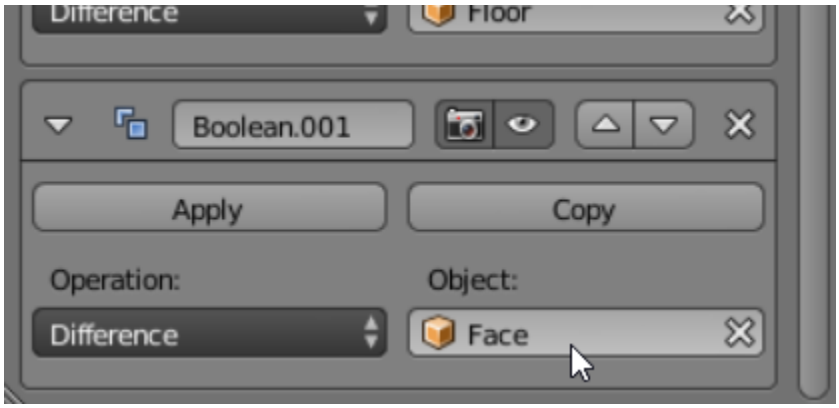

User Ortho (Local)
z
y
x
(1) Face

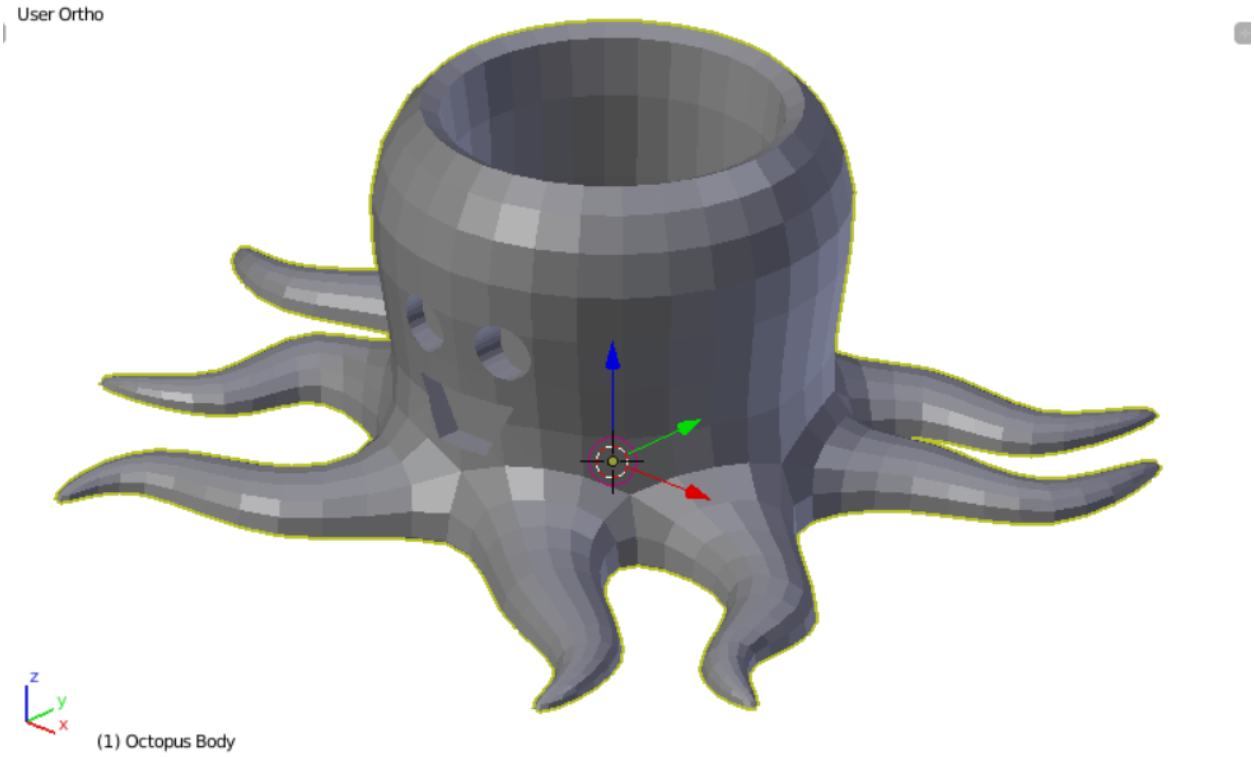

User Ortho (Local)
z
y
x
(1) Face

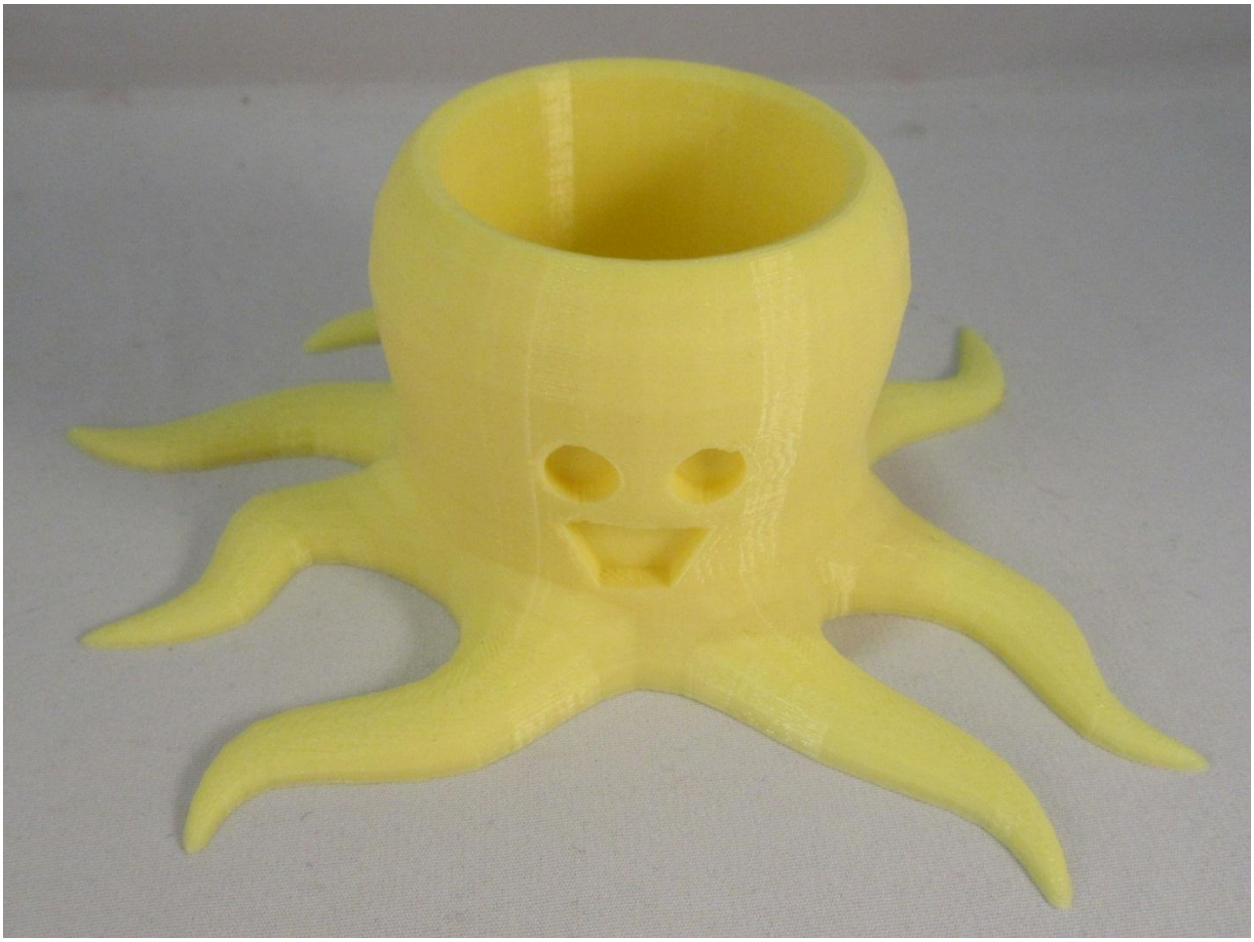

User Ortho
(1) Face

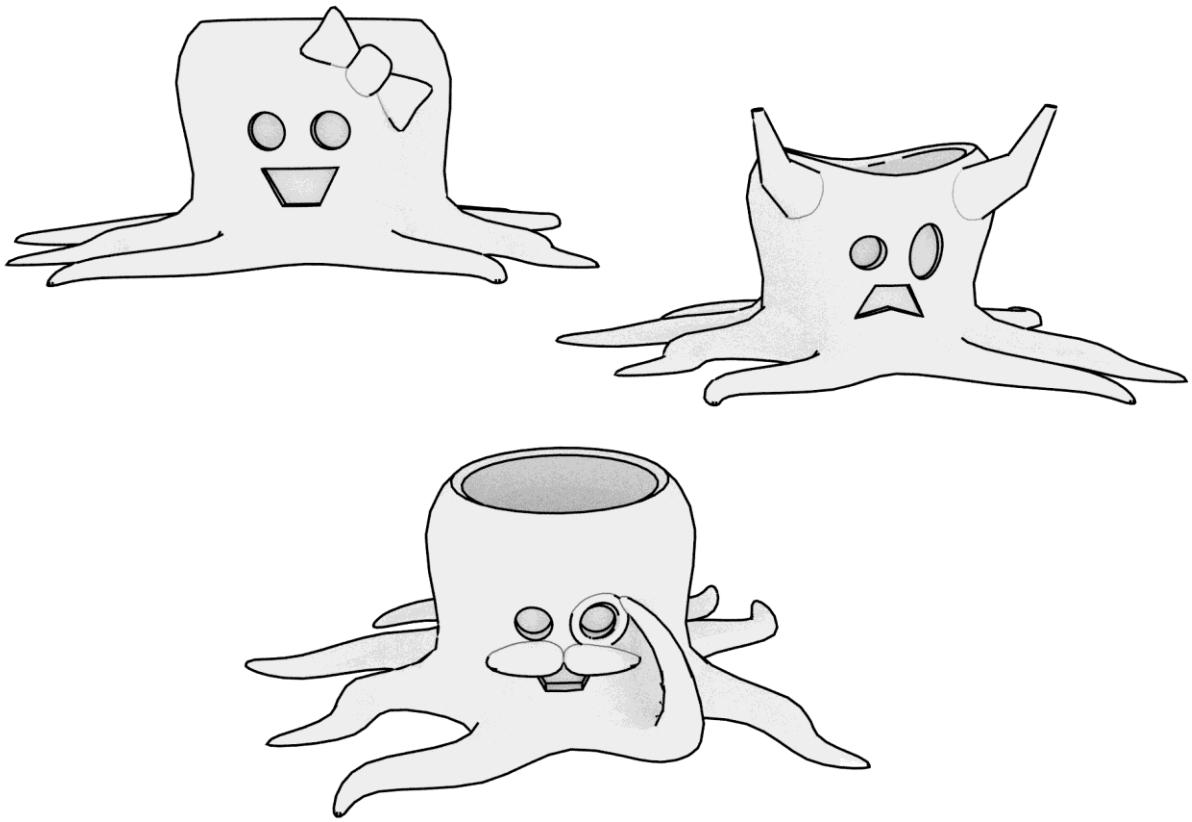

Front Ortho
(1) Face


Right Ortho
z
y
(1) Face

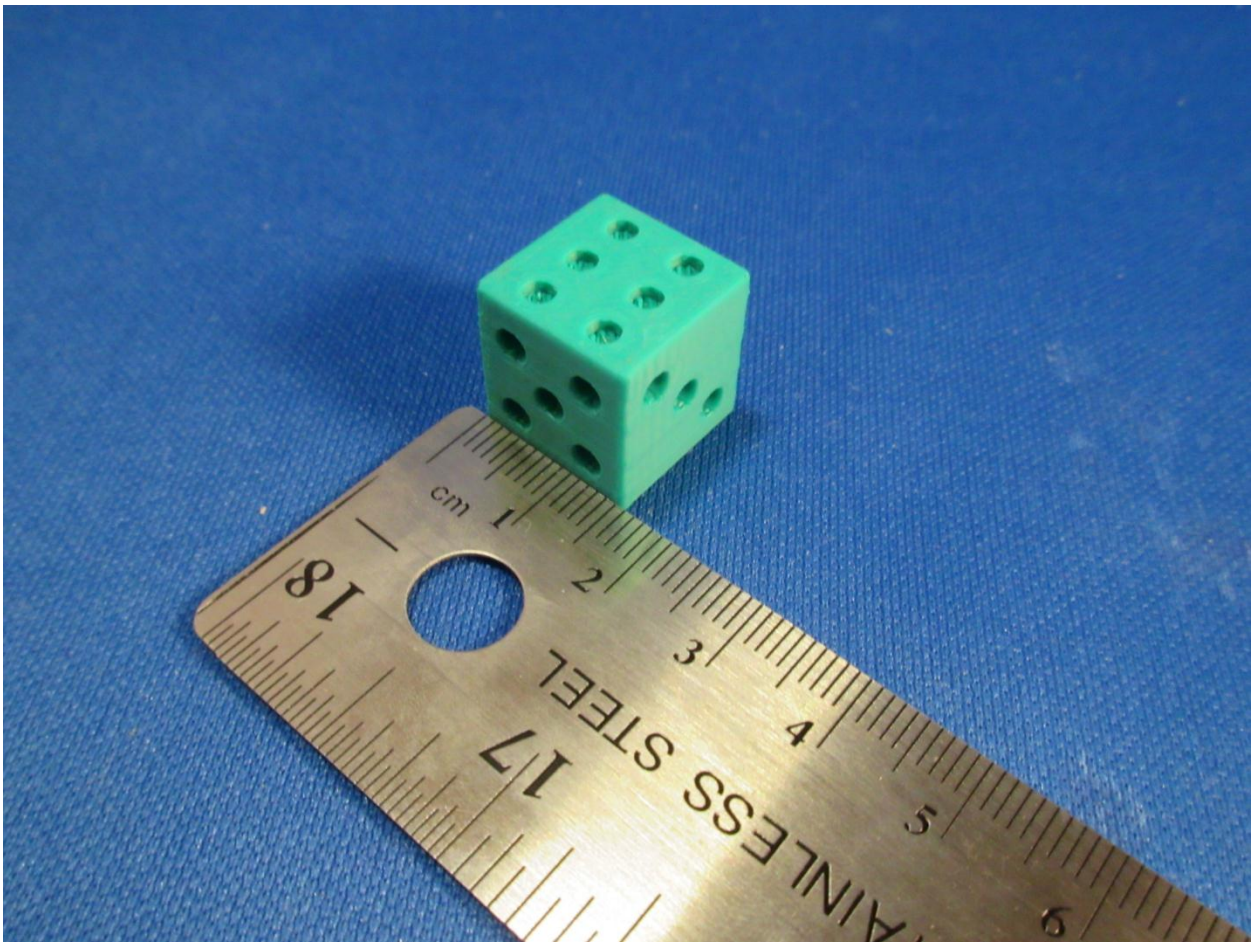

Difference
Floor
Boolean.001
Apply
Copy
Operation:
Object:
Difference
Face

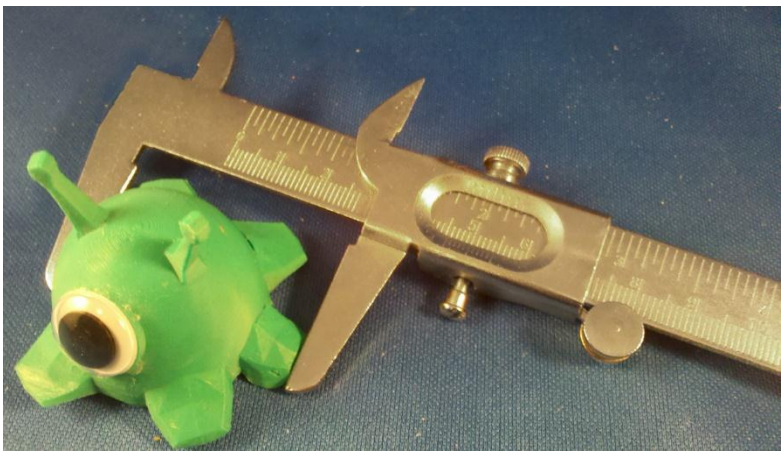

User Ortho
Z
Y
X
(1) Octopus Body

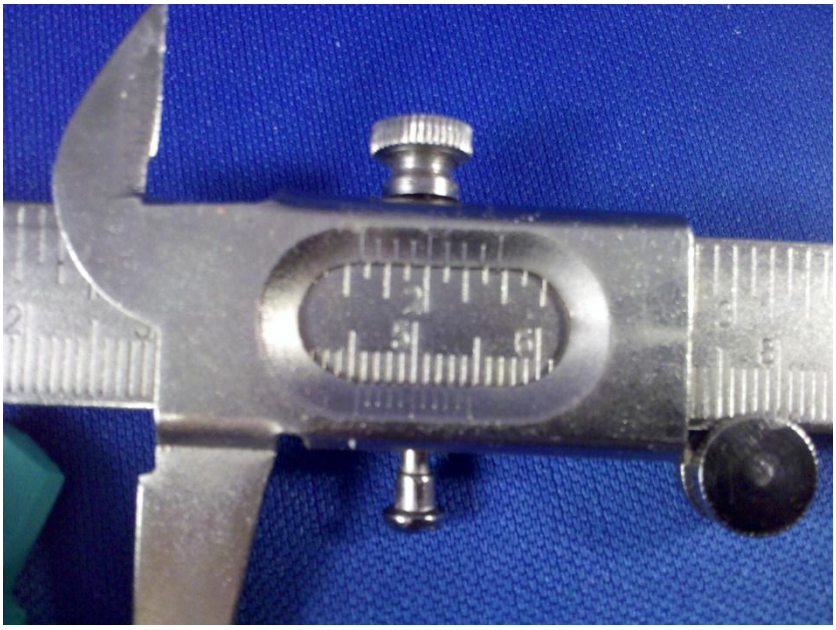


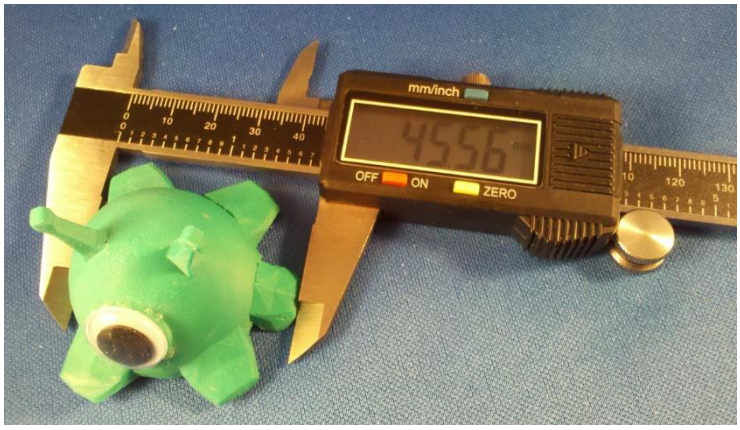


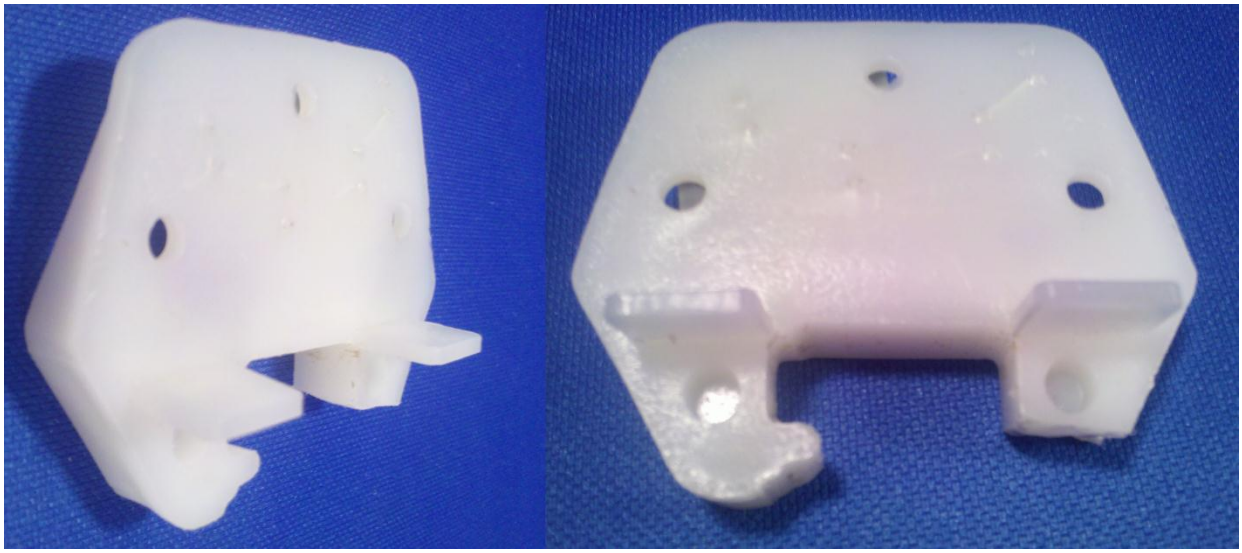
Chapter 4: Measuring Basics

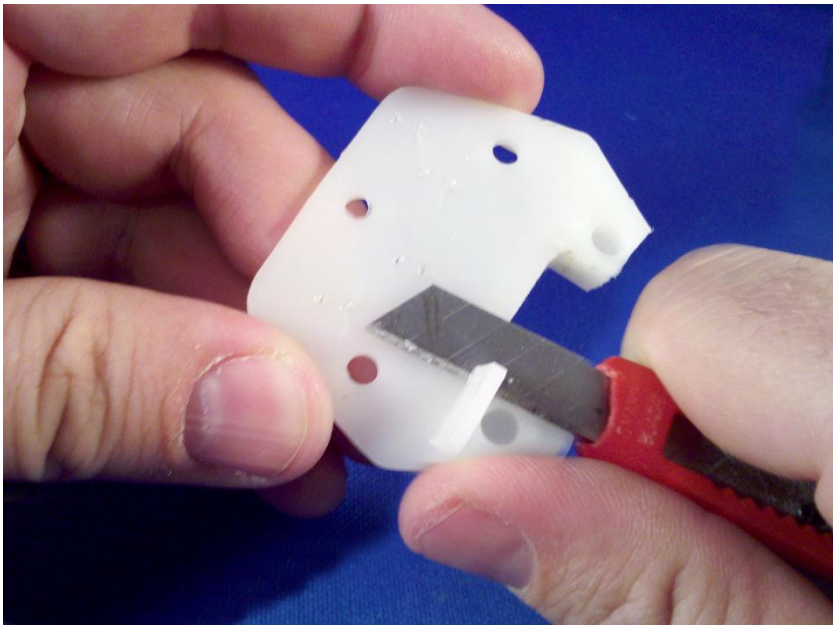


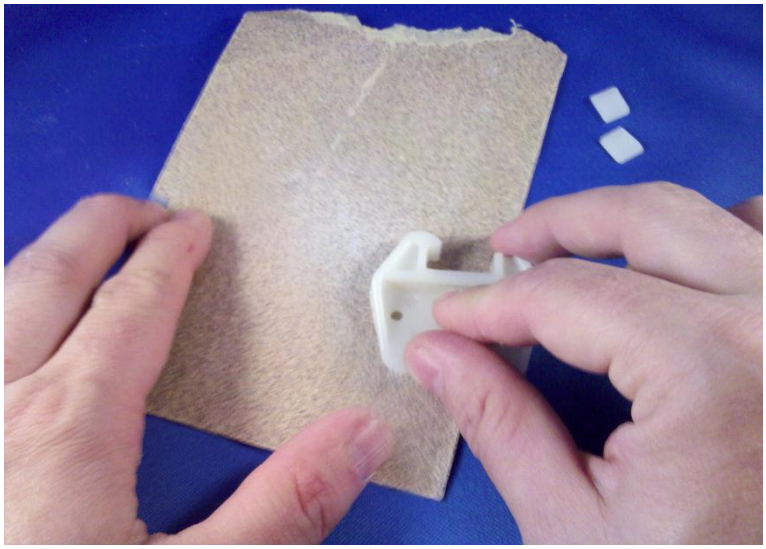


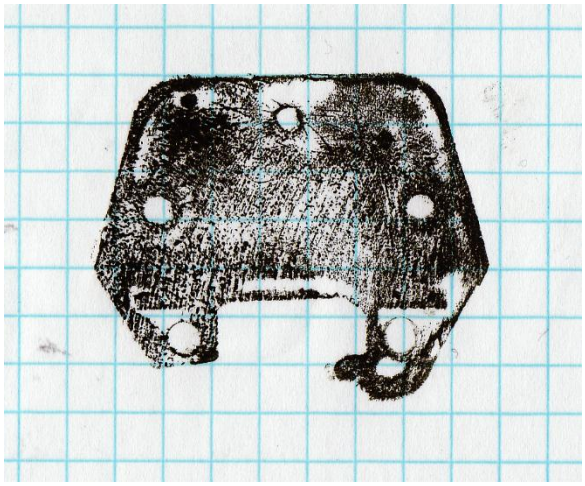


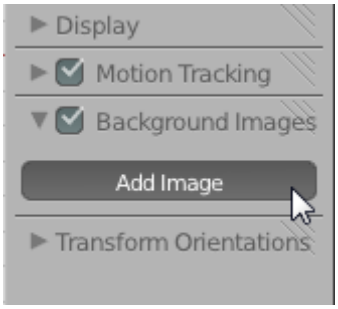

mm/inch
4556
OFF
ON
ZERO

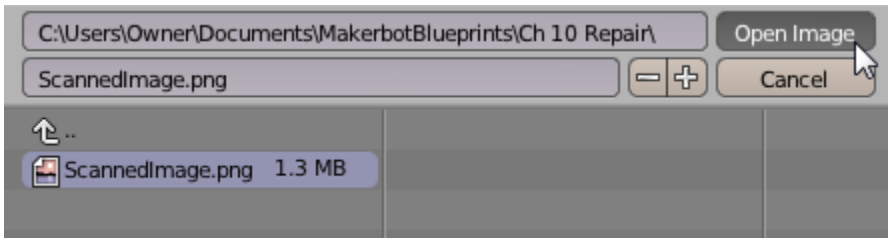









Display
Motion Tracking
Background Images
Add Image
Transform Orientations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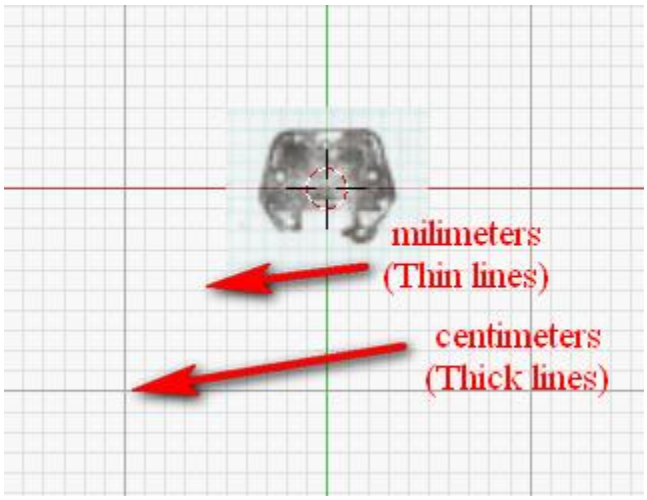
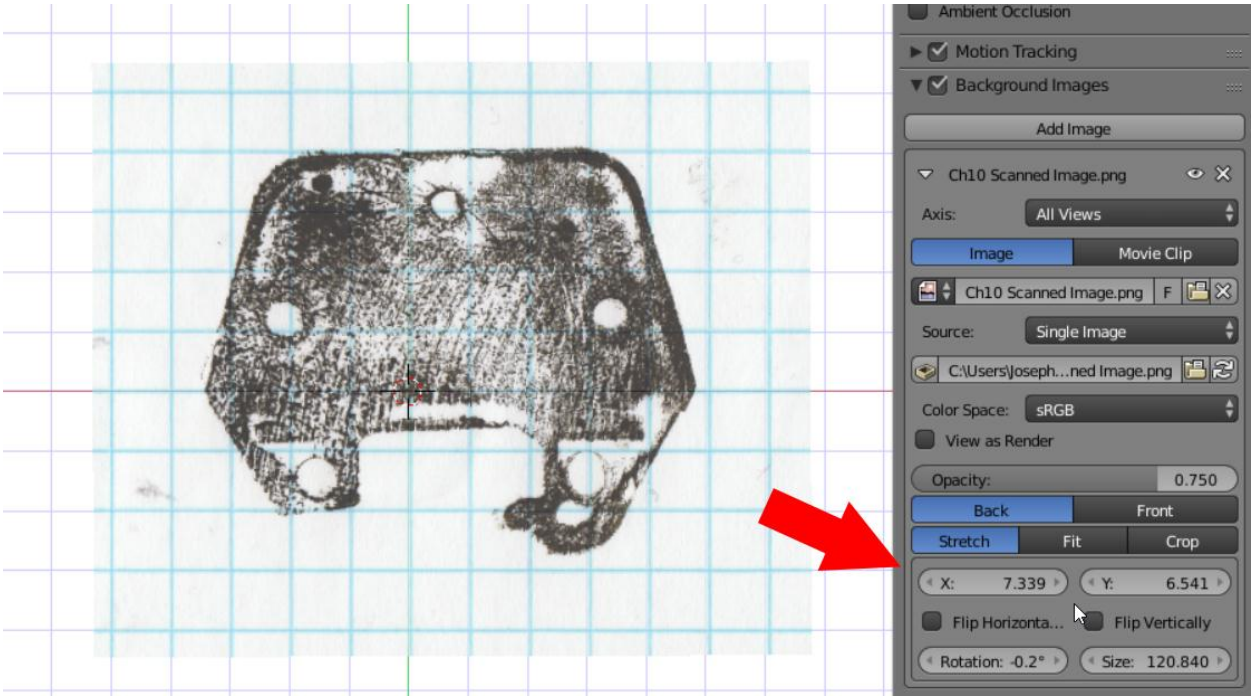
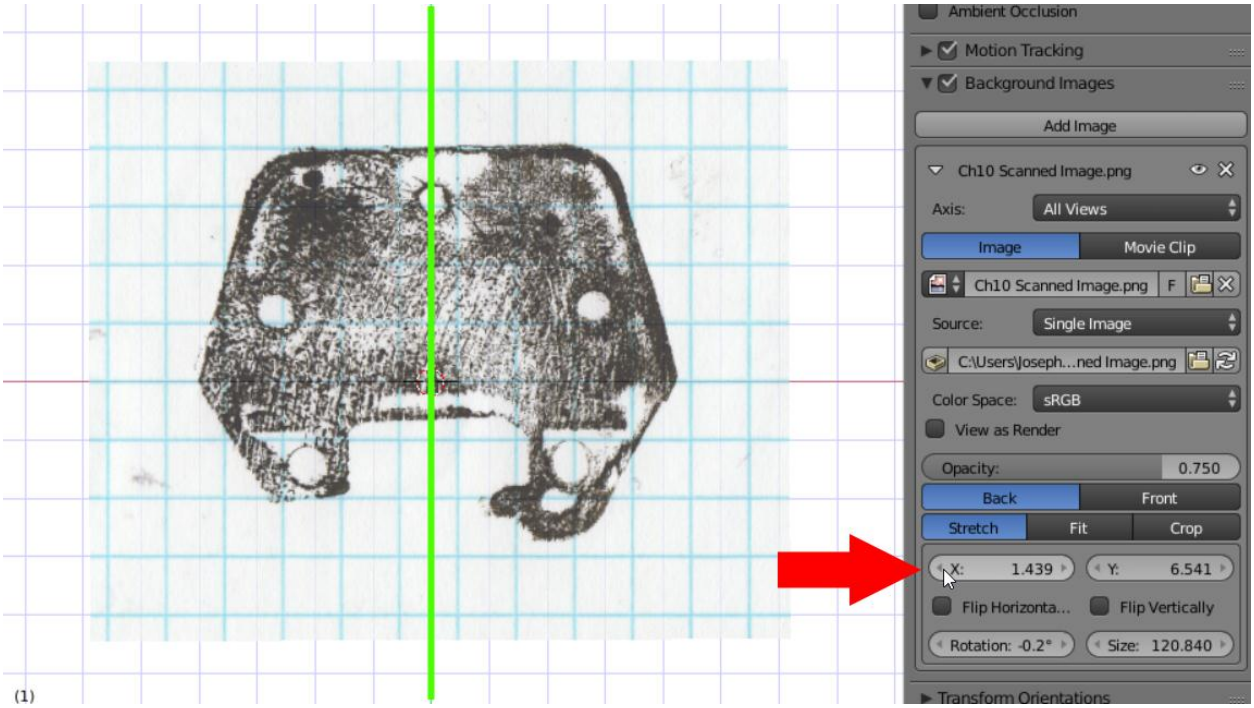
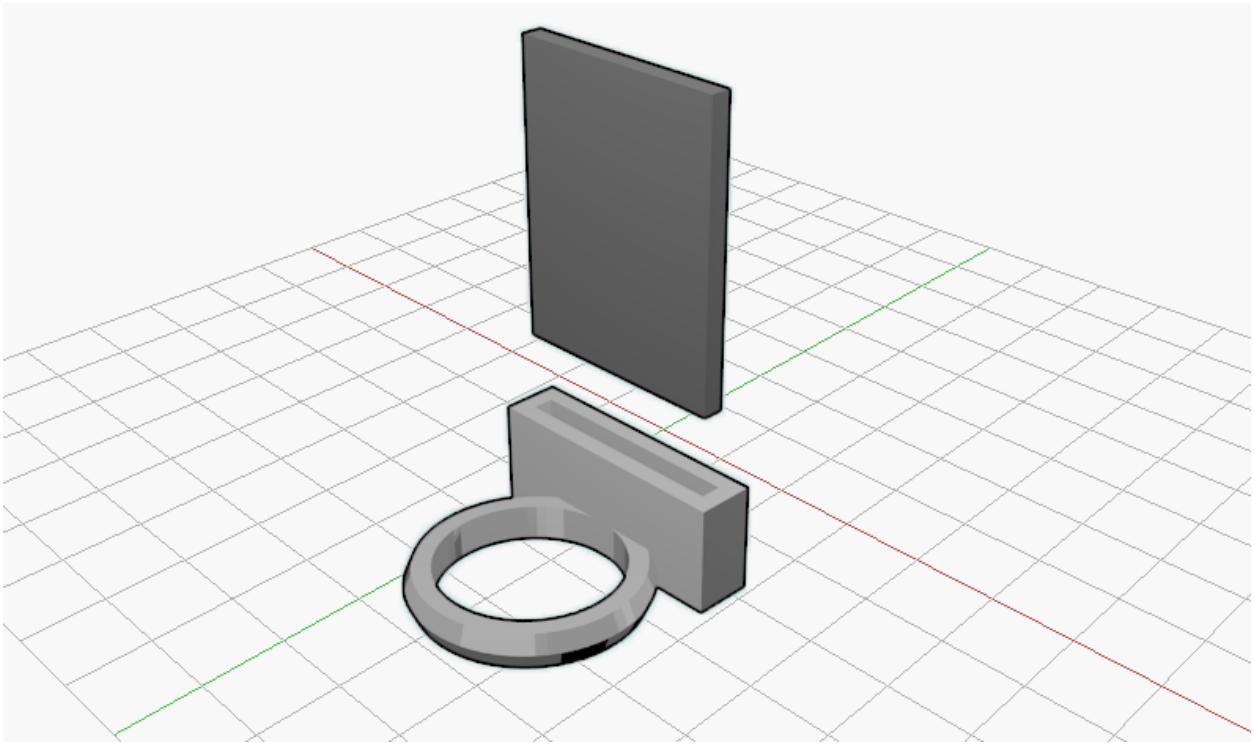
Open Image
ScannedImage.png
Cancel
..
ScannedImage.png 1.3 MB

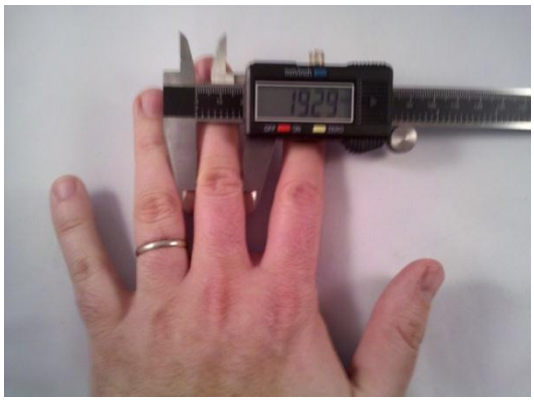

milimeters
(Thin lines)
centimeters
(Thick lines)

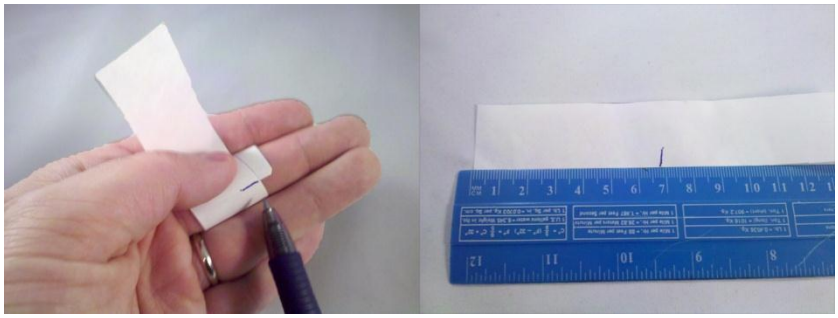

Ambient Occlusion
Motion Tracking
Background Images
Add Image
Ch10 Scanned Image.png
Axis: All Views
Image
Movie Clip
Ch10 Scanned Image.png
F
Source: Single Image
C:\Users\Joseph...ned Image.png
Color Space: sRGB
View as Render
Opacity: 0.750
Back
Front
Stretch
Fit
Crop
X: 7.339
Y: 6.541
Flip Horizonta...
Flip Vertically
Rotation: -0.2°
Size: 120.840

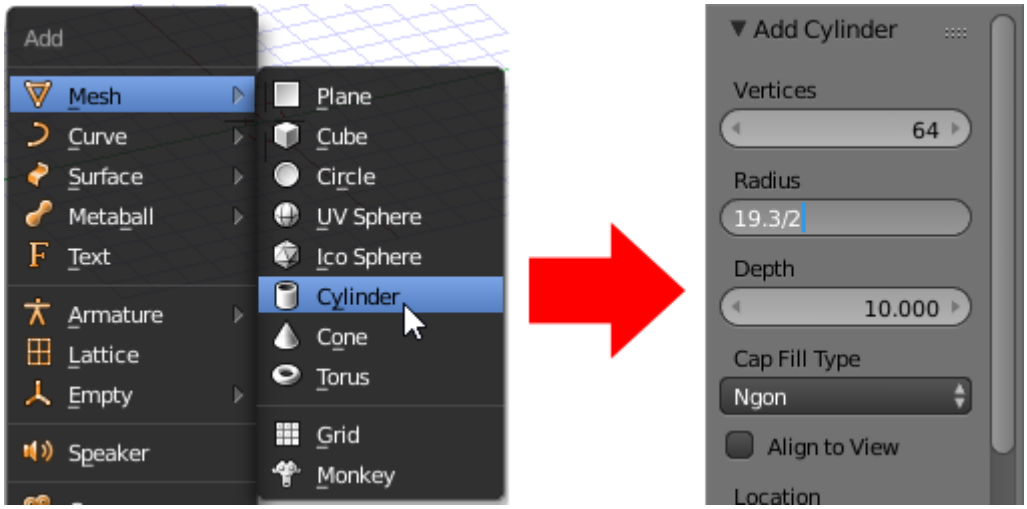

Ambient Occlusion
Motion Tracking
Background Images
Add Image
Ch10 Scanned Image.png
Axis: All Views
Image
Movie Clip
Ch10 Scanned Image.png
F
Source: Single Image
C:\Users\Joseph...ned Image.png
Color Space: sRGB
View as Render
Opacity: 0.750
Back
Front
Stretch
Fit
Crop
X: 1.439
Y: 6.541
Flip Horizonta...
Flip Vertically
Rotation: -0.2°
Size: 120.840
Transform Orientations
(1)

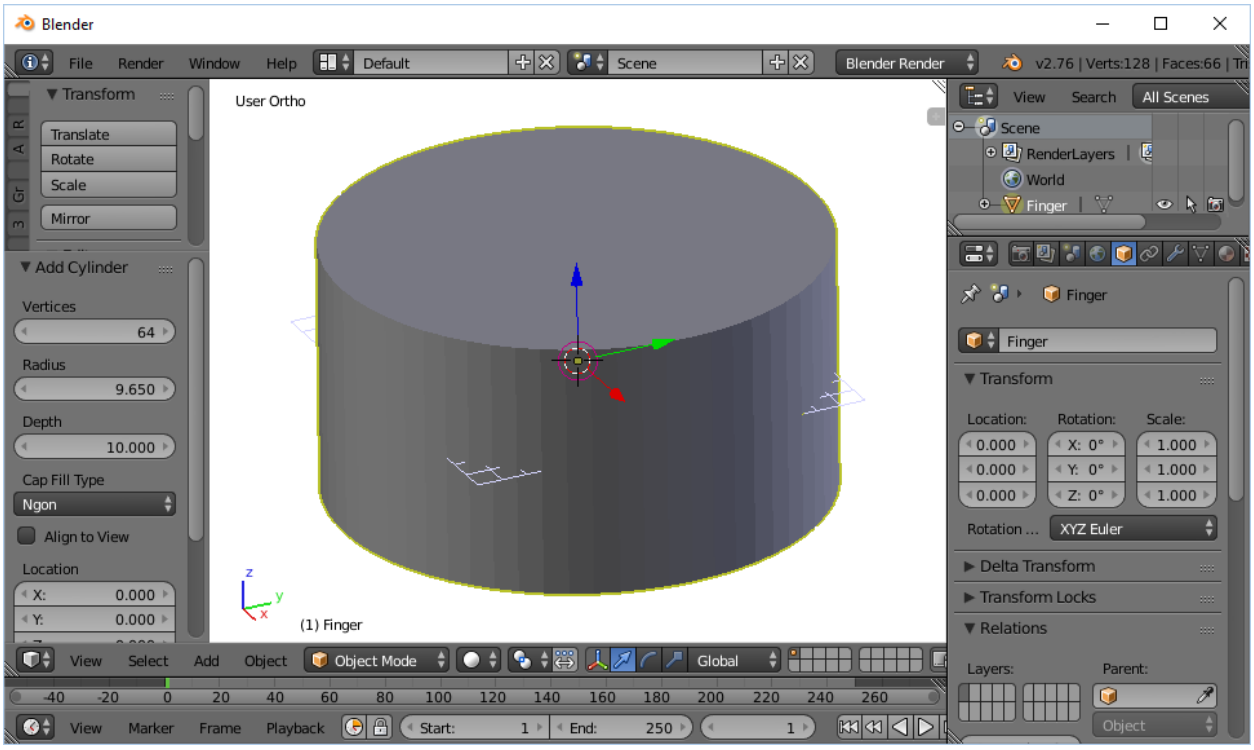
Chapter 5: An SD Card Holder Ring

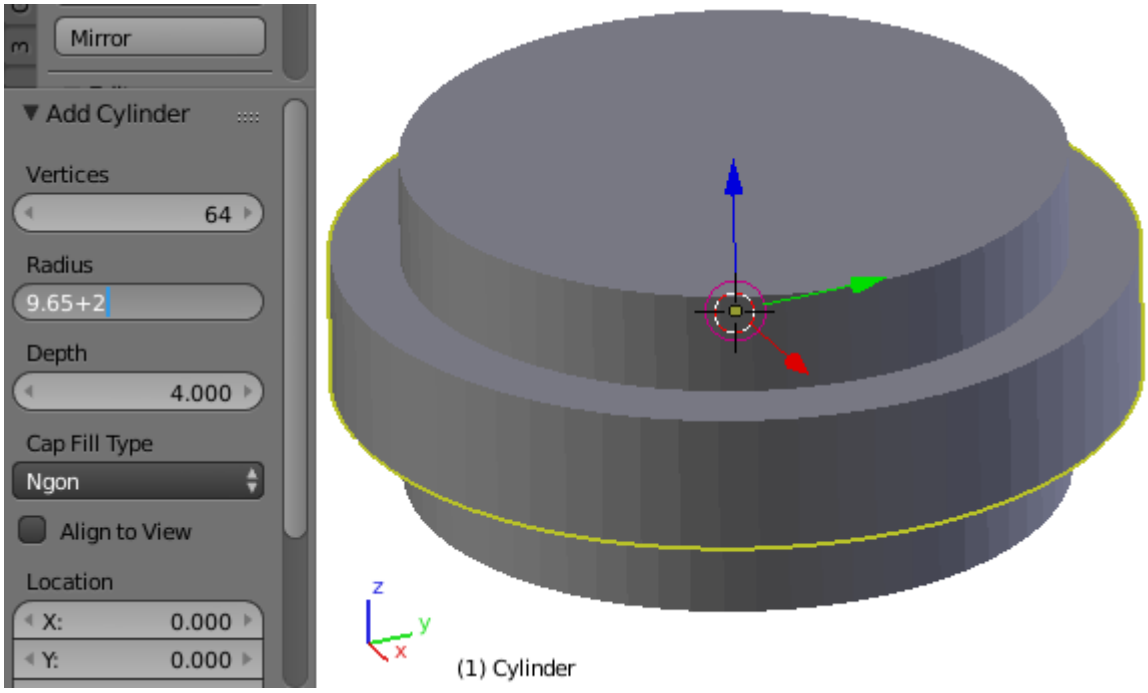


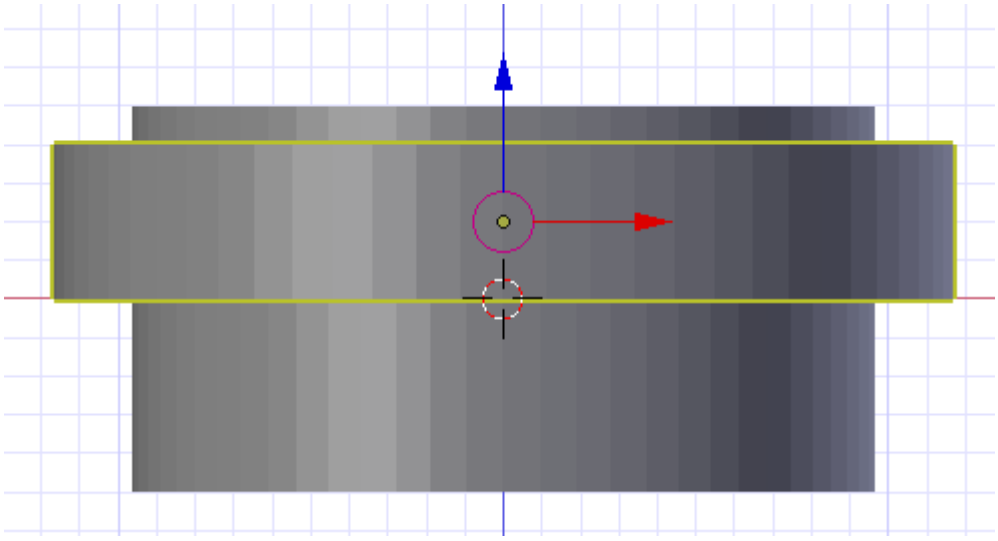


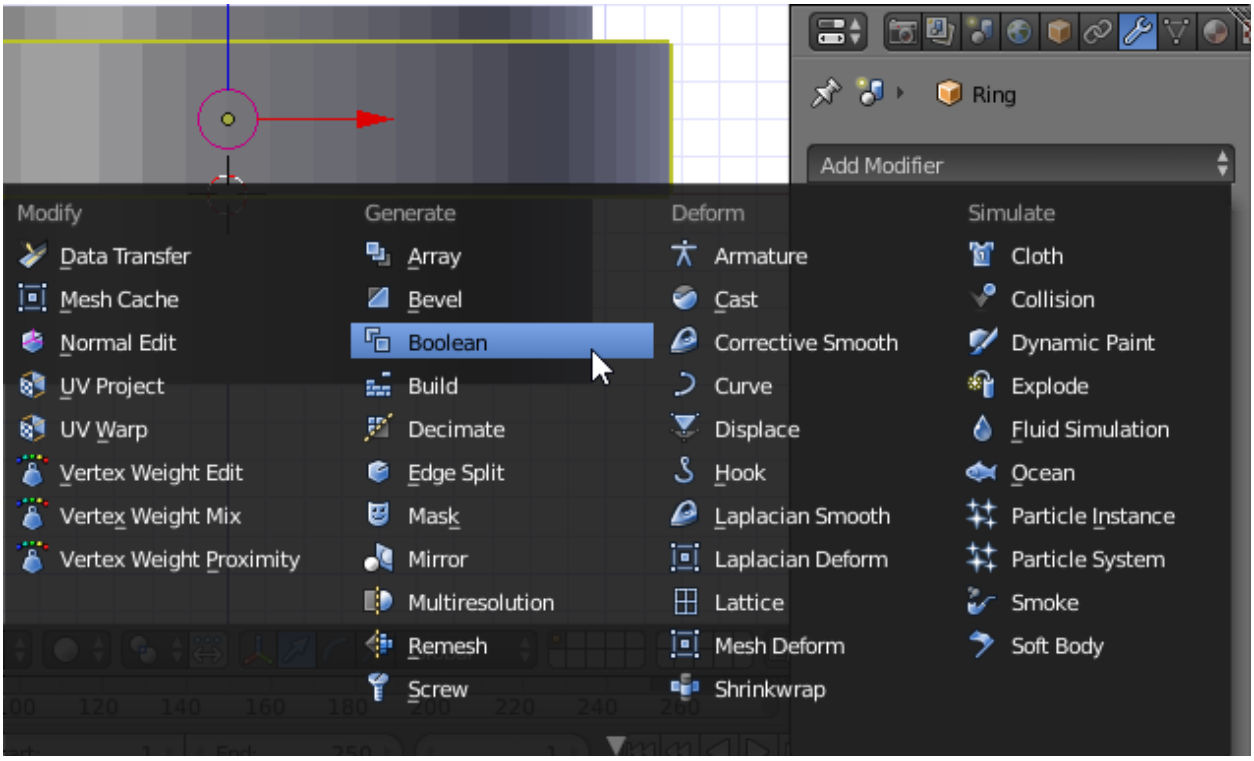



Add
Mesh
Curve
Surface
Metaball
Text
Armature
Lattice
Empty
Speaker
Plane
Cube
Circle
UV Sphere
Ico Sphere
Cylinder
Cone
Torus
Grid
Monkey
Add Cylinder
Vertices
64
Radius
19.3/2
Depth
10.000
Cap Fill Type
Ngon
Align to View
Location

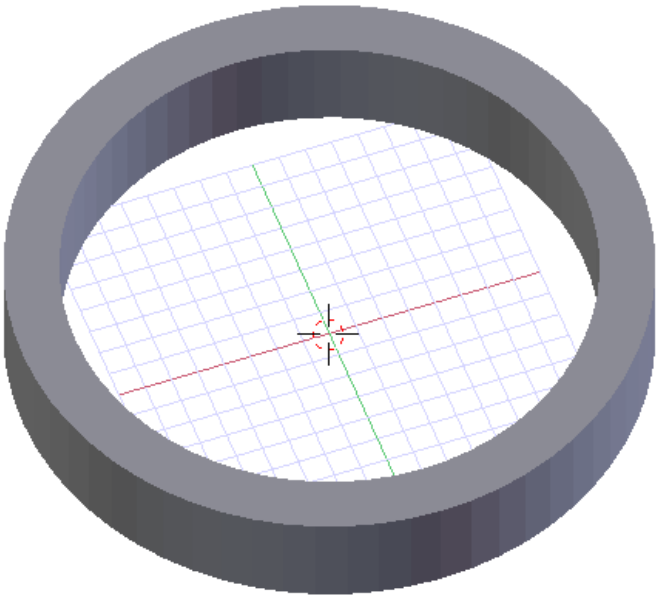

Blender
File
Render
Window
Help
Default
Scene
Blender Render
v2.76 | Verts:128 | Faces:66
Transform
Translate
Rotate
Scale
Mirror
Add Cylinder
Vertices
64
Radius
9.650
Depth
10.000
Cap Fill Type
Ngon
Align to View
Location
X: 0.000
Y: 0.000
User Ortho
(1) Finger
View
Search
All Scenes
Scene
RenderLayers
World
Finger
Transform
Location:
Rotation:
Scale:
Rotation ...
XYZ Euler
Delta Transform
Transform Locks
Relations
Layers:
Parent:
Object Mode
Global
Start: 1
End: 250

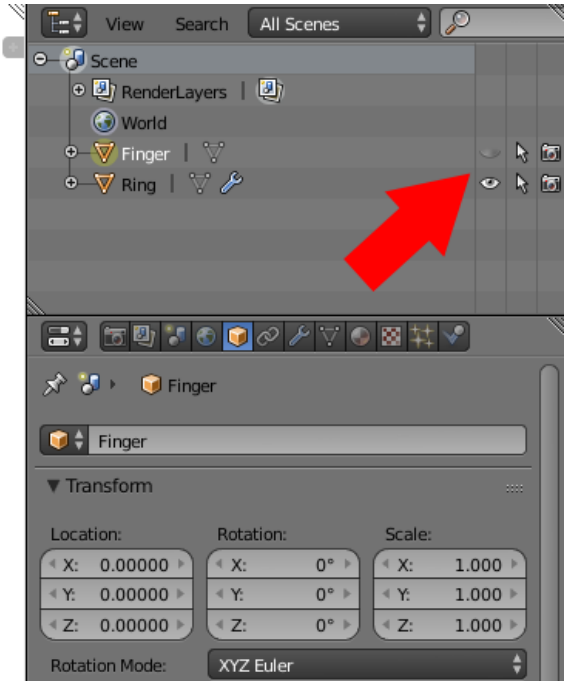

Mirror
Add Cylinder
Vertices
64
Radius
9.65+2
Depth
4.000
Cap Fill Type
Ngon
Align to View
Location
X: 0.000
Y: 0.000
z
y
x
(1) Cylinder

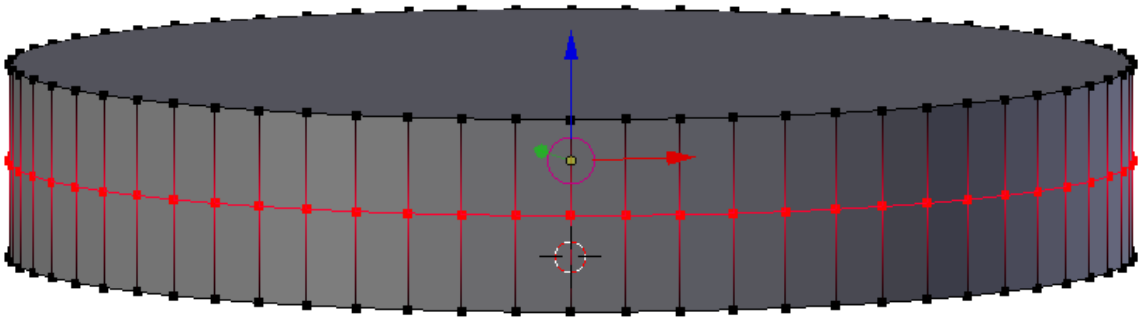


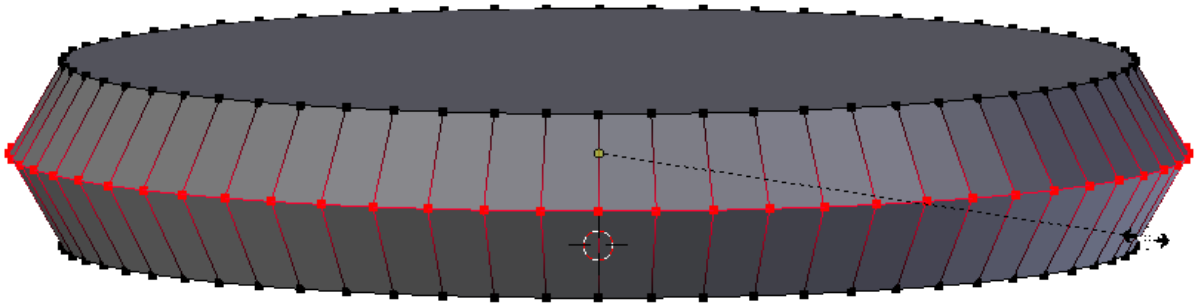

Ring
Add Modifier
Modify
Data Transfer
Mesh Cache
Normal Edit
UV Project
UV Warp
Vertex Weight Edit
Vertex Weight Mix
Vertex Weight Proximity
Generate
Array
Bevel
Boolean
Build
Decimate
Edge Split
Mask
Mirror
Multiresolution
Remesh
Screw
Deform
Armature
Cast
Corrective Smooth
Curve
Displace
Hook
Laplacian Smooth
Laplacian Deform
Lattice
Mesh Deform
Shrinkwrap
Simulate
Cloth
Collision
Dynamic Paint
Explode
Fluid Simulation
Ocean
Particle Instance
Particle System
Smoke
Soft Body

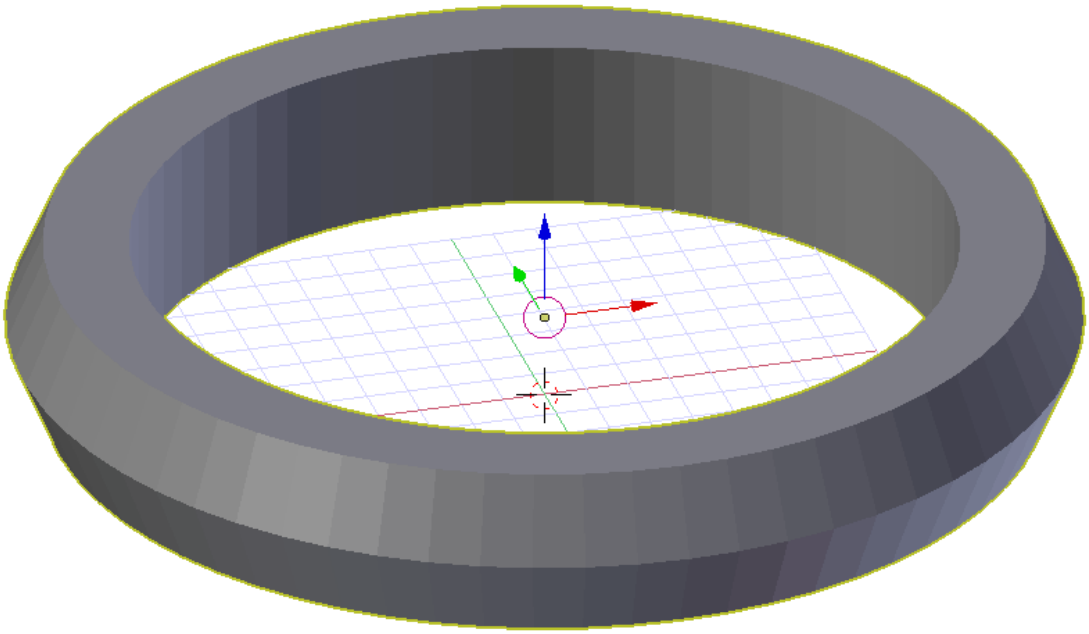
Add Modifier
Boolean
Apply
Copy
Operation:
Object:
Difference
Finger

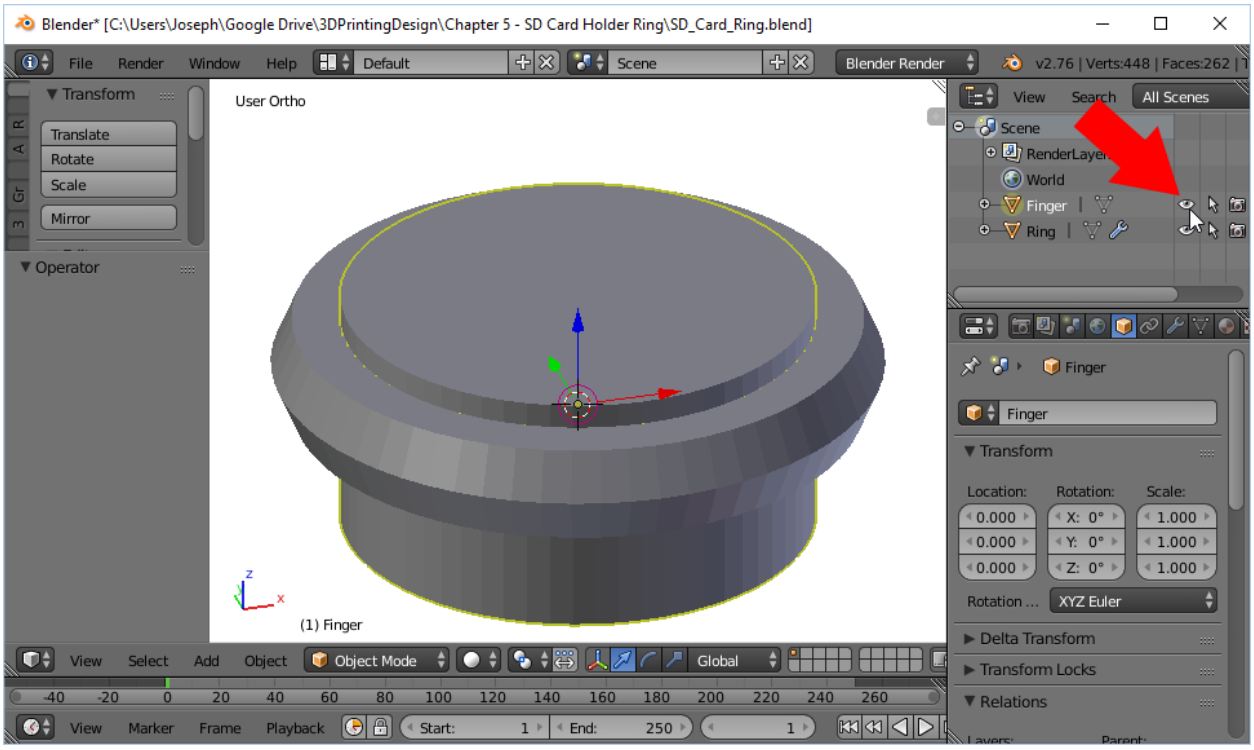


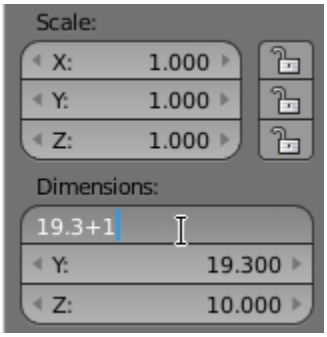

View
Search
All Scenes
Scene
RenderLayers
World
Finger
Ring
Finger
Finger
Transform
Location:
X: 0.00000
Y: 0.00000
Z: 0.00000
Rotation:
X: 0°
Y: 0°
Z: 0°
Scale:
X: 1.000
Y: 1.000
Z: 1.000
Rotation Mode:
XYZ Euler

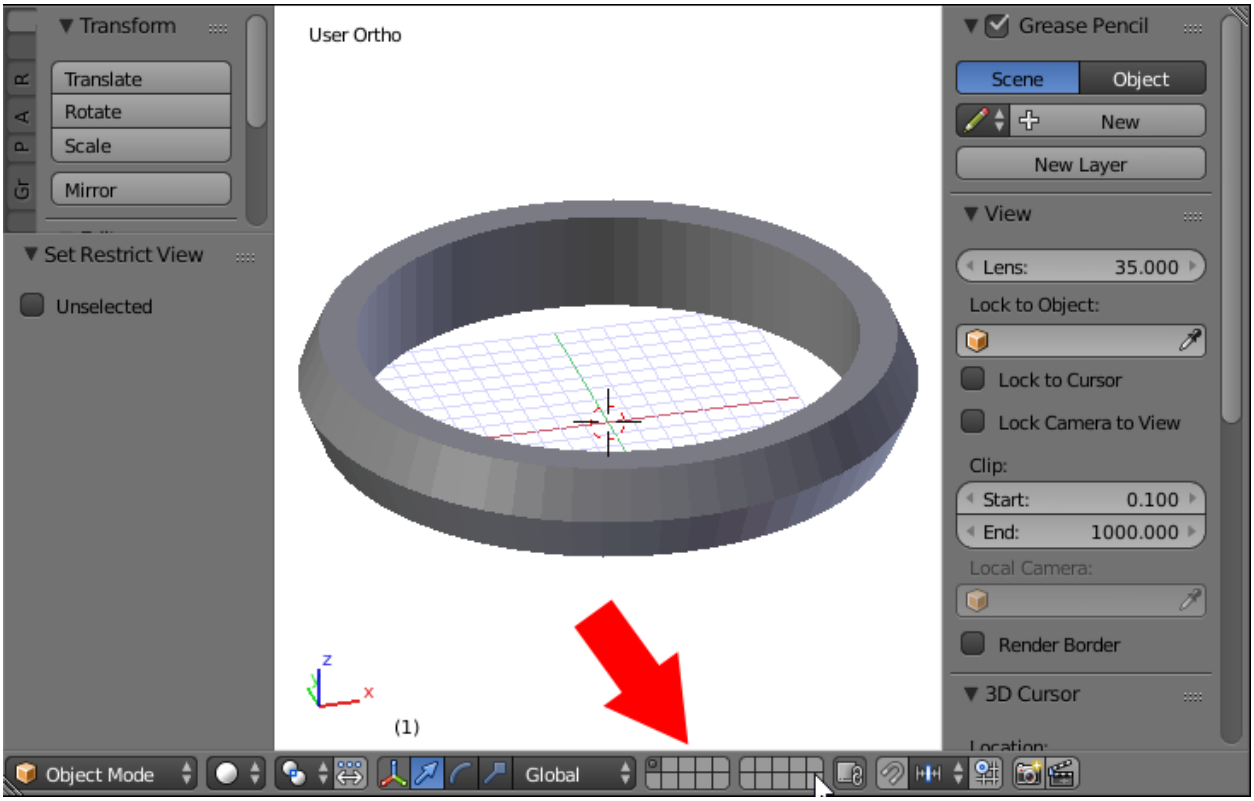


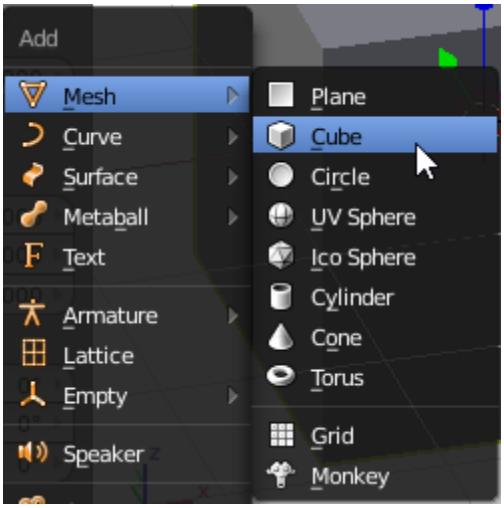


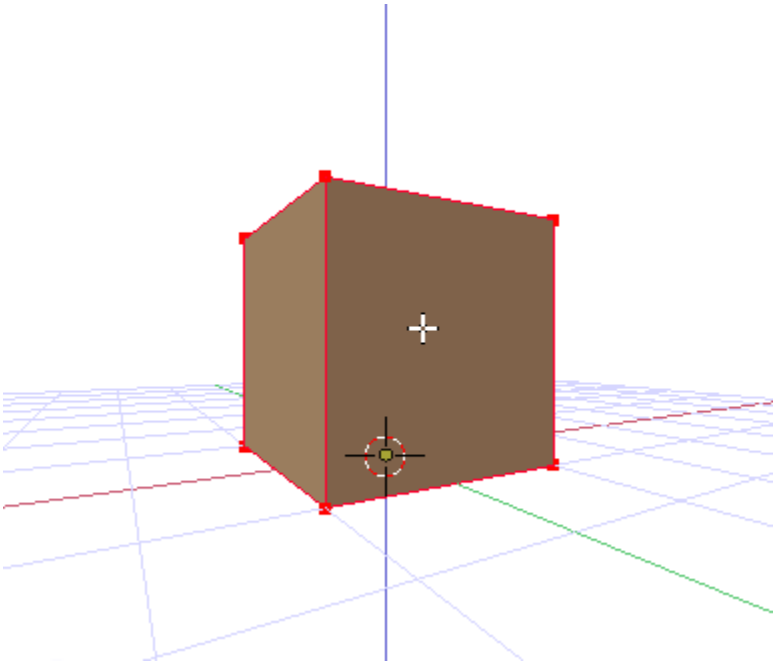


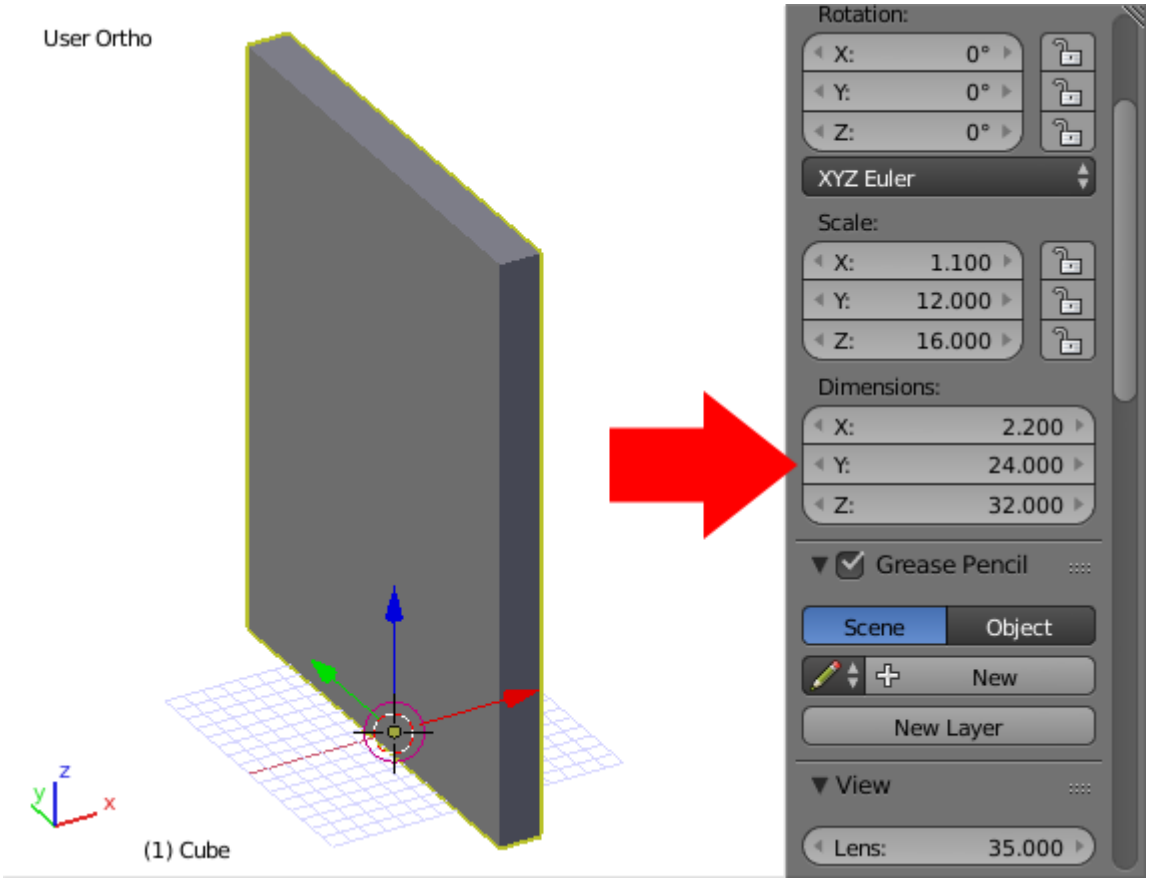

Blender* [C:\Users\Joseph\Google Drive\3DPrintingDesign\Chapter 5 - SD Card Holder Ring\SD_Card_Ring.blend]
File Render Window Help Default Scene Blender Render v2.76 | Verts:448 | Faces:262
Transform
Translate
Rotate
Scale
Mirror
Operator
User Ortho
(1) Finger
View Search All Scenes
Scene
RenderLayer
World
Finger
Ring
Location: Rotation: Scale:
Rotation ... XYZ Euler
Delta Transform
Transform Locks
Relations
View Select Add Object Object Mode Global
View Marker Frame Playback Start: 1 End: 250

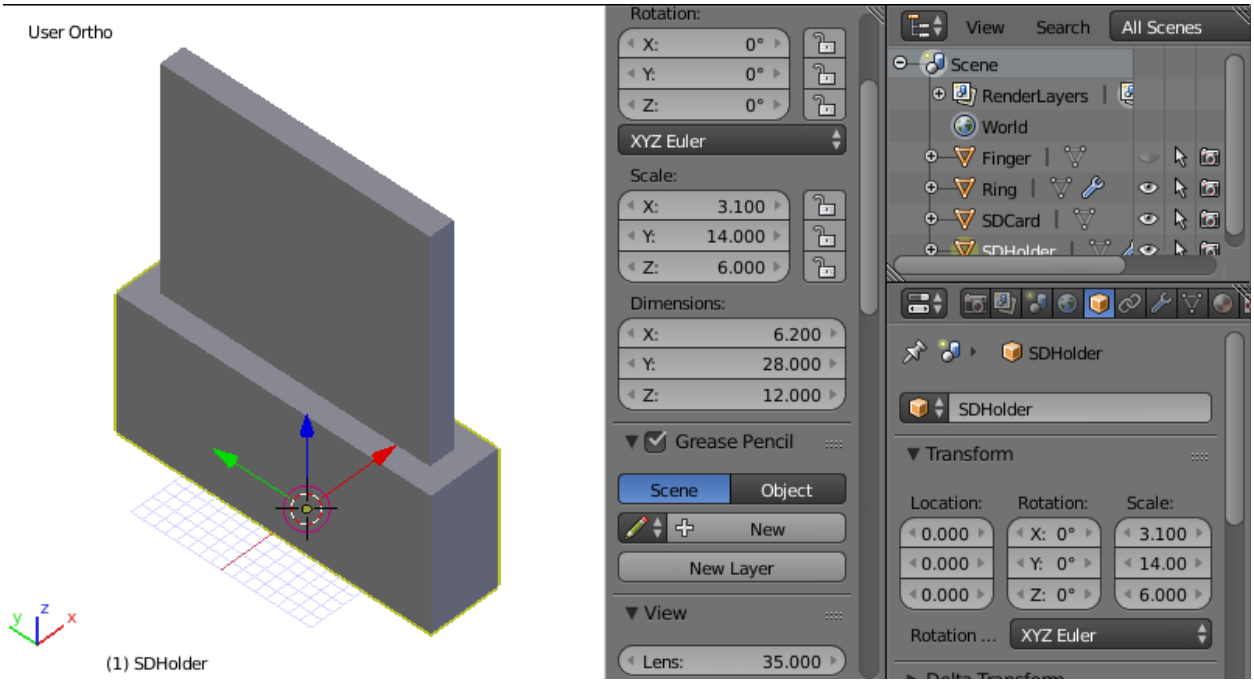

Scale:
X: 1.000
Y: 1.000
Z: 1.000
Dimensions:
19.3+1
Y: 19.300
Z: 10.000

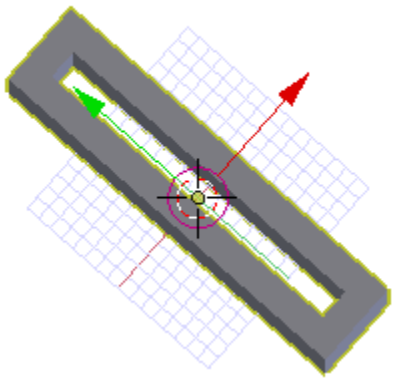

Transform
Translate
Rotate
Scale
Mirror
Set Restrict View
Unselected
User Ortho
(1)
Grease Pencil
Scene
Object
New
New Layer
View
Lens: 35.000
Lock to Object:
Lock to Cursor
Lock Camera to View
Clip:
Start: 0.100
End: 1000.000
Local Camera:
Render Border
3D Cursor
Object Mode
Global

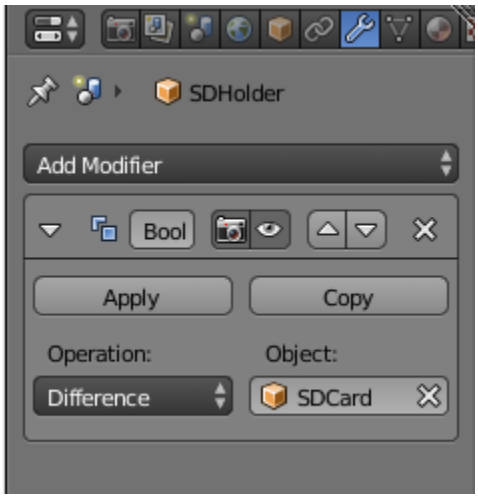

Add
Mesh
Curve
Surface
Metaball
Text
Armature
Lattice
Empty
Speaker
Plane
Cube
Circle
UV Sphere
Ico Sphere
Cylinder
Cone
Torus
Grid
Monkey

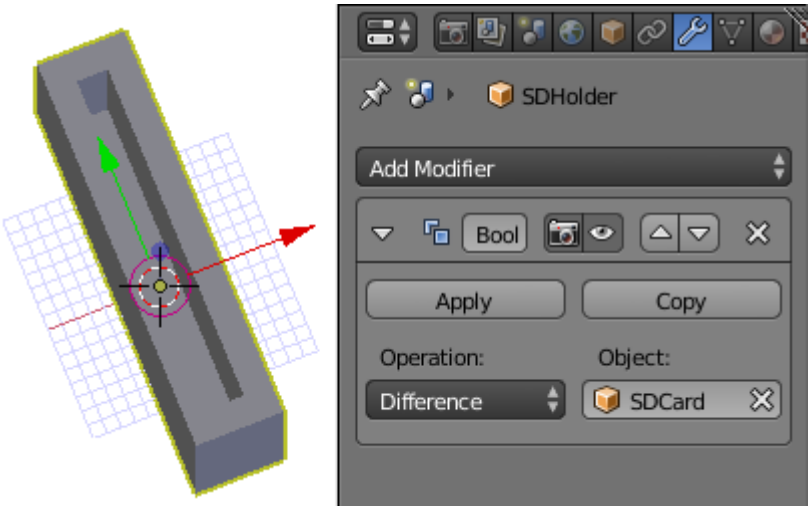


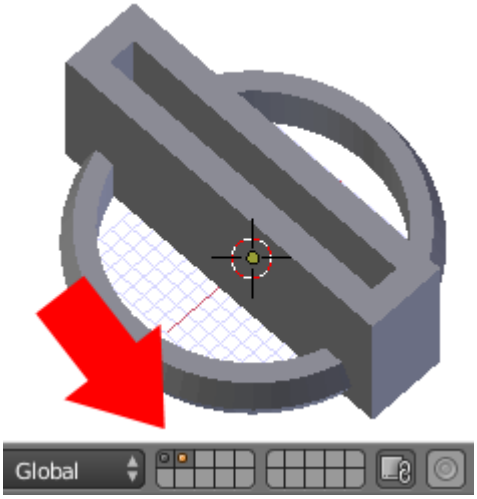

User Ortho
(1) Cube
Rotation:
X: 0°
Y: 0°
Z: 0°
XYZ Euler
Scale:
X: 1.100
Y: 12.000
Z: 16.000
Dimensions:
X: 2.200
Y: 24.000
Z: 32.000
Grease Pencil
Scene
Object
New
New Layer
View
Lens: 35.000


User Ortho
(1) SDHolder
Rotation:
X: 0°
Y: 0°
Z: 0°
XYZ Euler
Scale:
X: 3.100
Y: 14.000
Z: 6.000
Dimensions:
X: 6.200
Y: 28.000
Z: 12.000
Grease Pencil
Scene
Object
New
New Layer
View
Lens: 35.000
View
Search
All Scenes
Scene
RenderLayers
World
Finger
Ring
SDCard
SDHolder
SDHolder
SDHolder
Transform
Location:
Rotation:
Scale:
0.000
0.000
0.000
X: 0°
Y: 0°
Z: 0°
3.100
14.00
6.000
Rotation ...
XYZ Euler

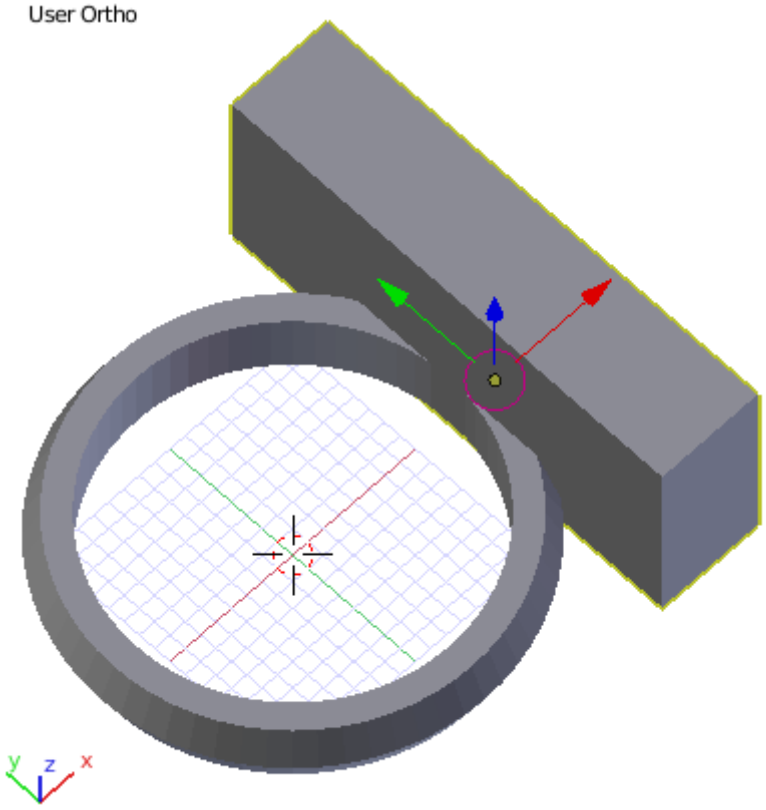



SDHolder
Add Modifier
Bool
Apply
Copy
Operation:
Object:
Difference
SDCard


SDHolder
Add Modifier
Bool
Apply
Copy
Operation:
Object:
Difference
SDCard

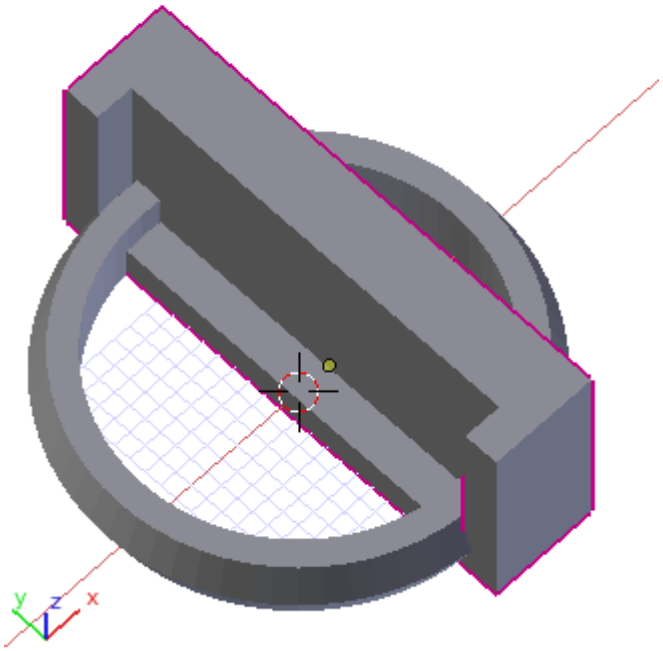

Global

User Ortho

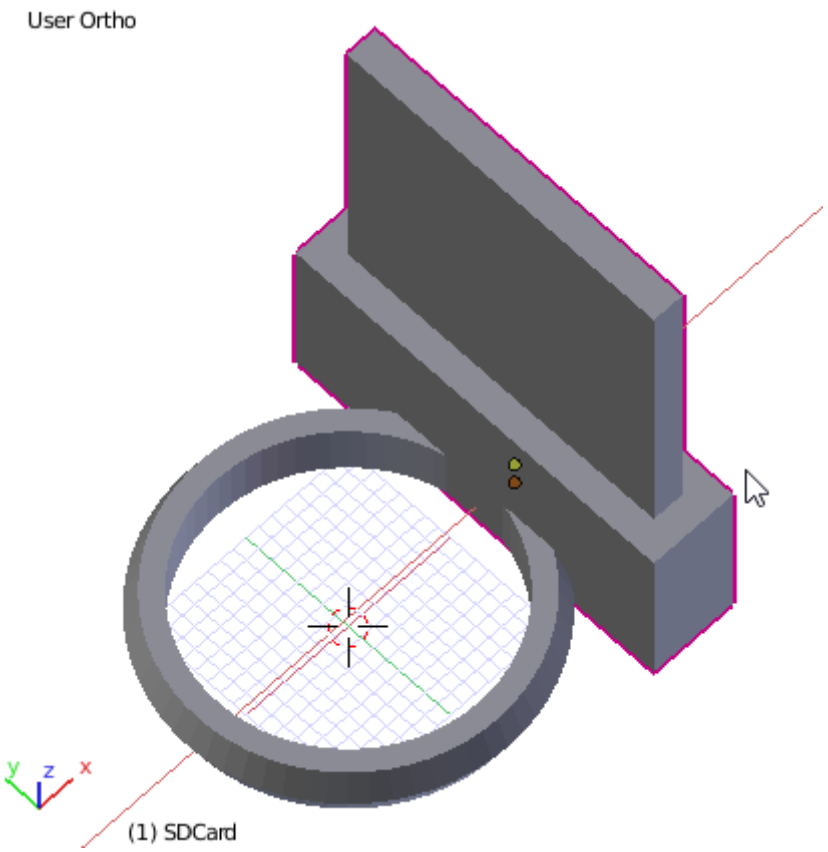


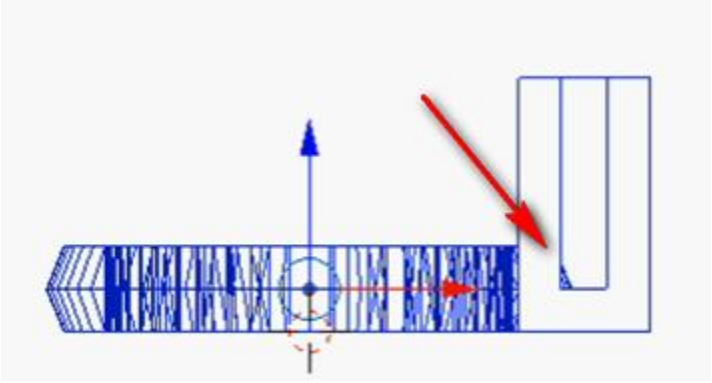
(1) SDHolder

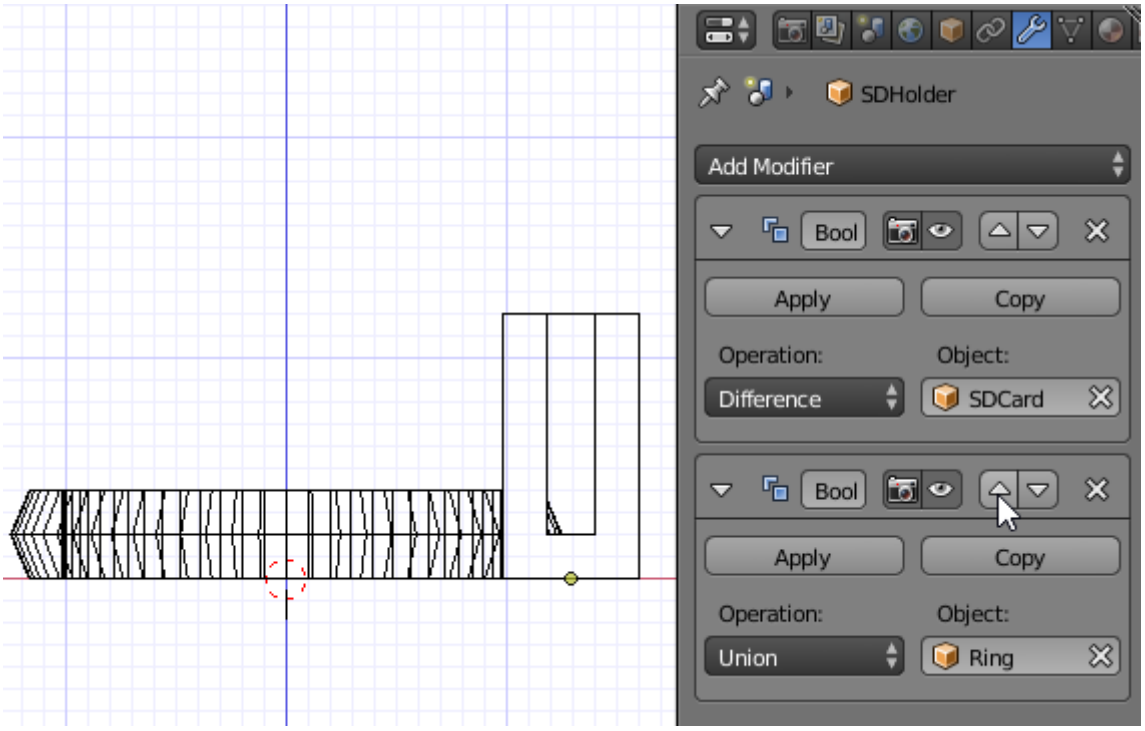
User Ortho

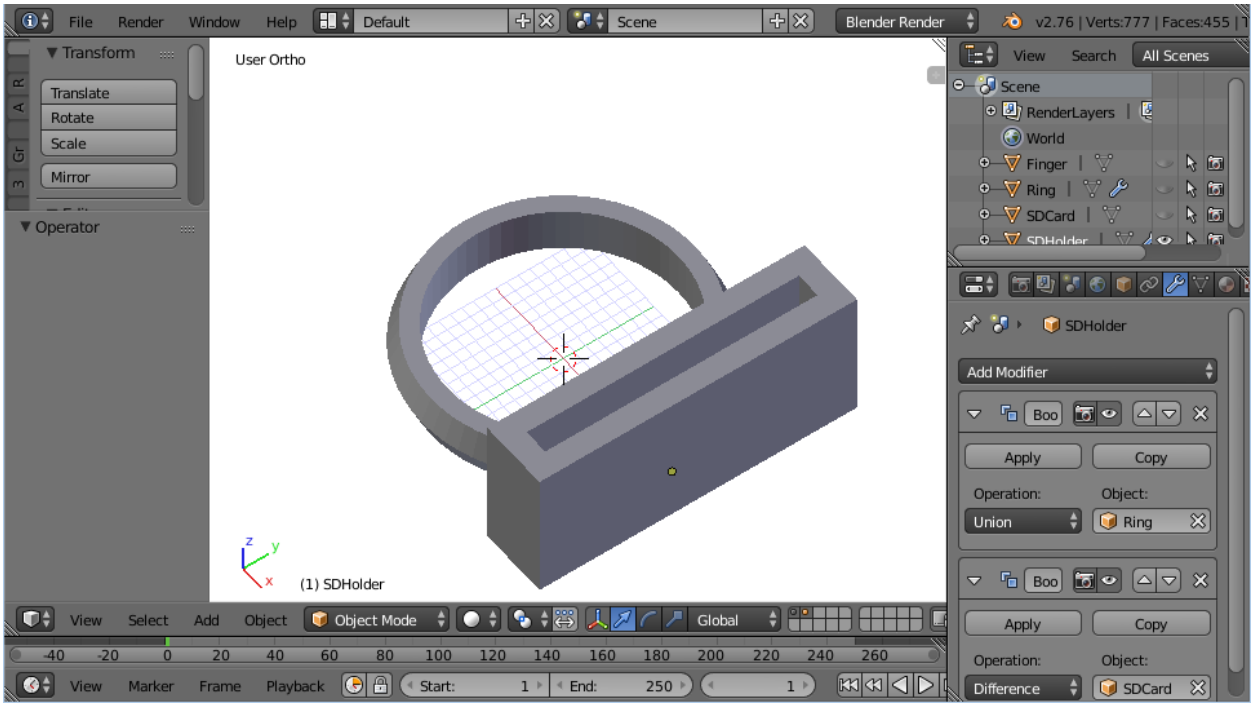


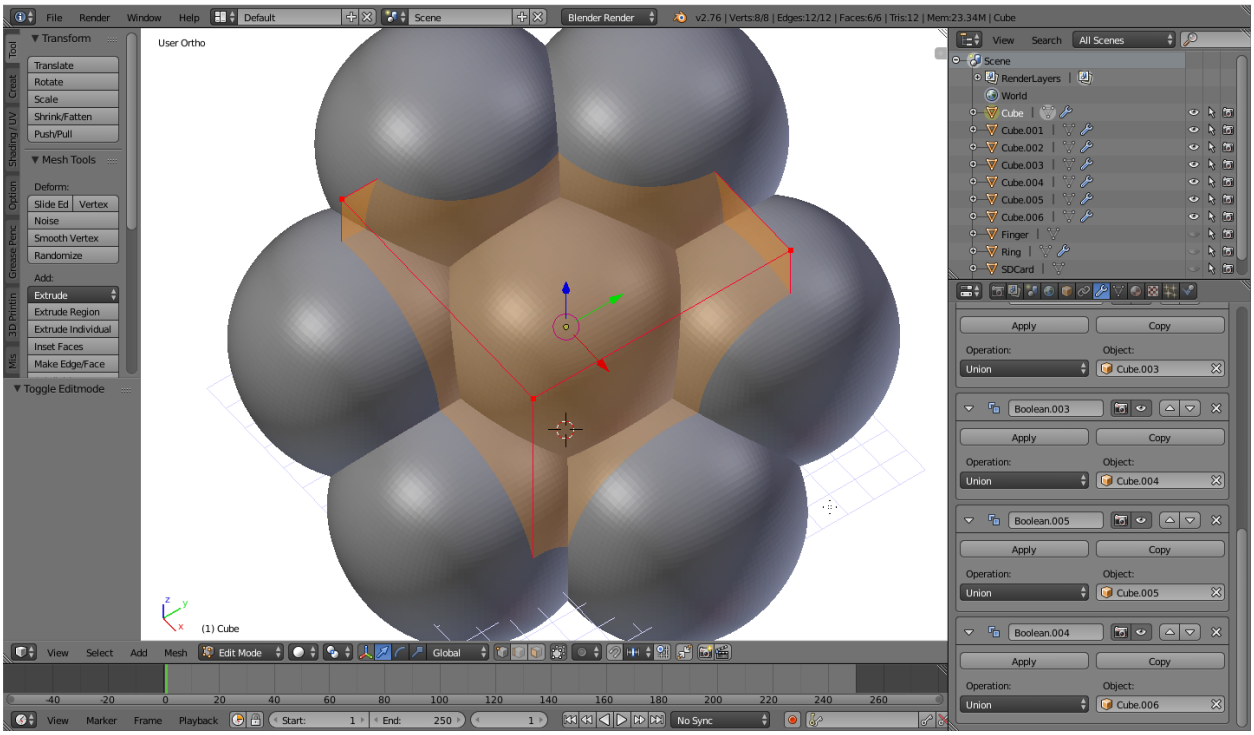
(1) SDHolder

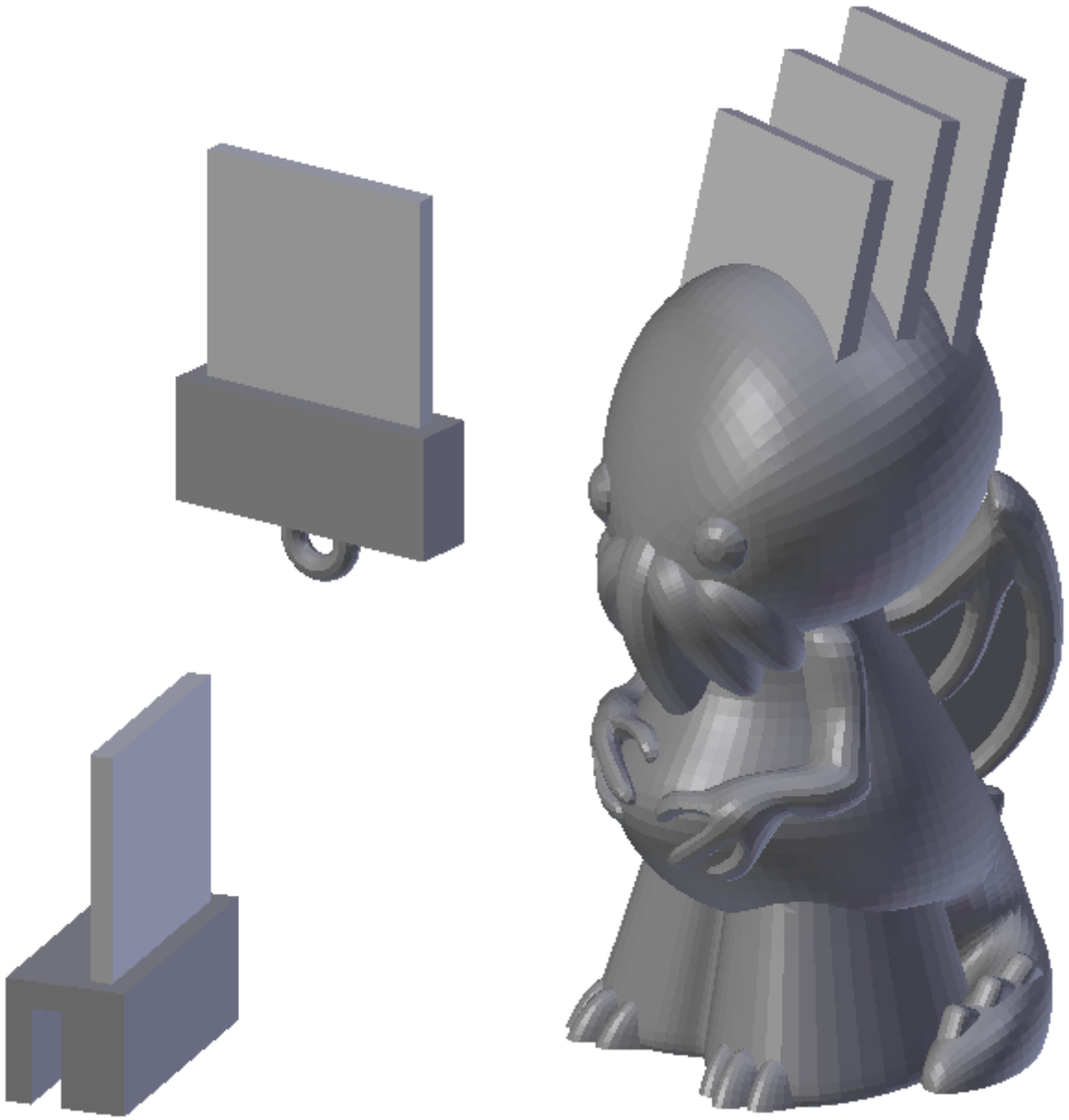

User Ortho
y
z
x
(1) SDCard



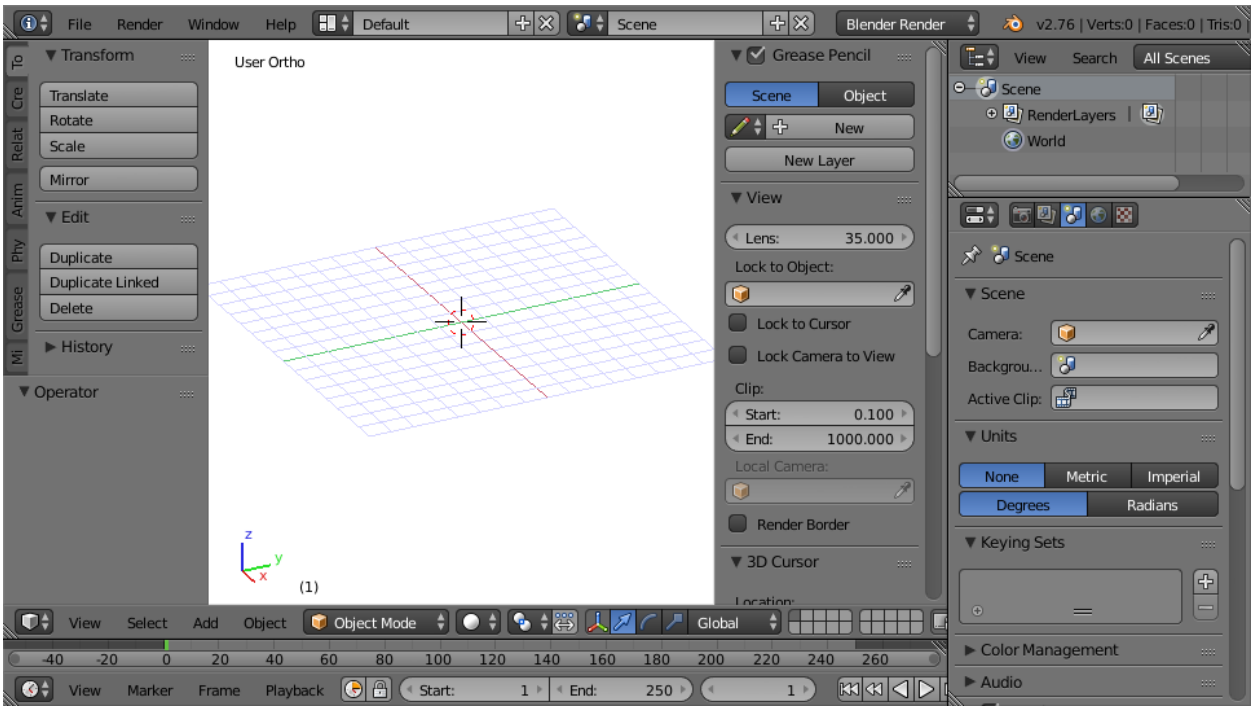

SDHolder
Add Modifier
Bool
Apply
Copy
Operation:
Object:
Difference
SDCard
Bool
Apply
Copy
Operation:
Object:
Union
Ring

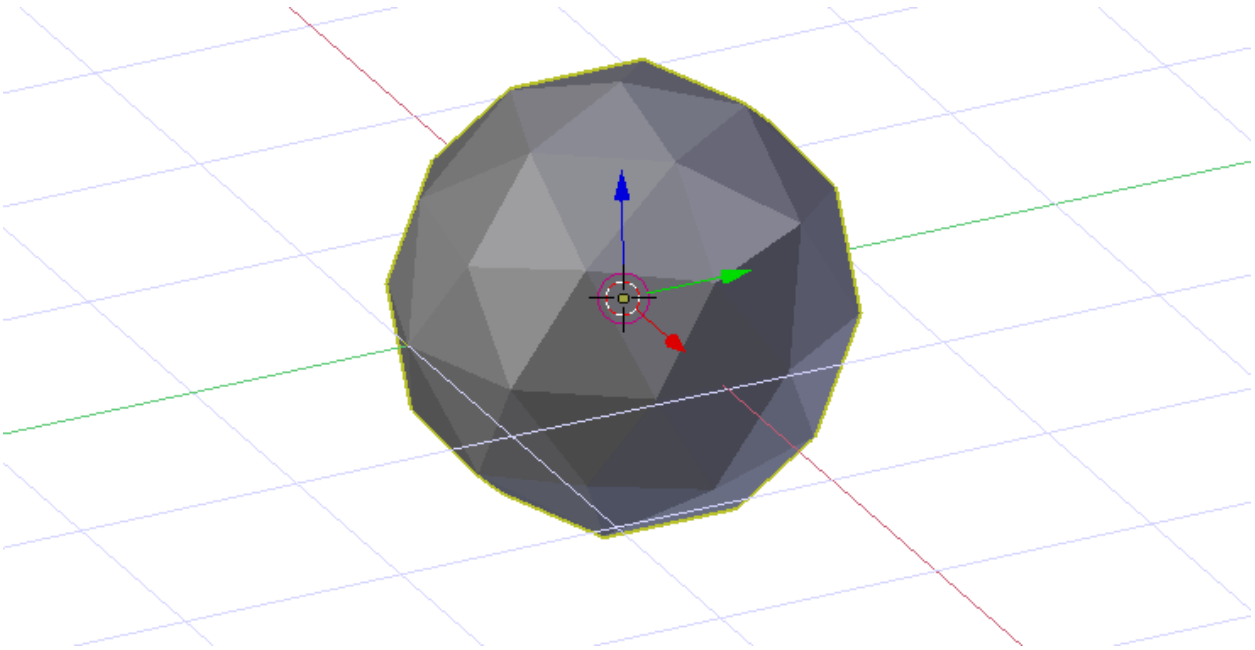

File
Render
Window
Help
Default
Scene
Blender Render
v2.76 | Verts:777 | Faces:455
Transform
Translate
Rotate
Scale
Mirror
Operator
User Ortho
(1) SDHolder
View
Search
All Scenes
Scene
RenderLayers
World
Finger
Ring
SDCard
SDHolder
Add Modifier
Apply
Copy
Operation:
Object:
Union
Ring
Apply
Copy
Operation:
Object:
Difference
SDCard
View
Select
Add
Object
Object Mode
Global
View
Marker
Frame
Playback
Start:
1
End:
250
1

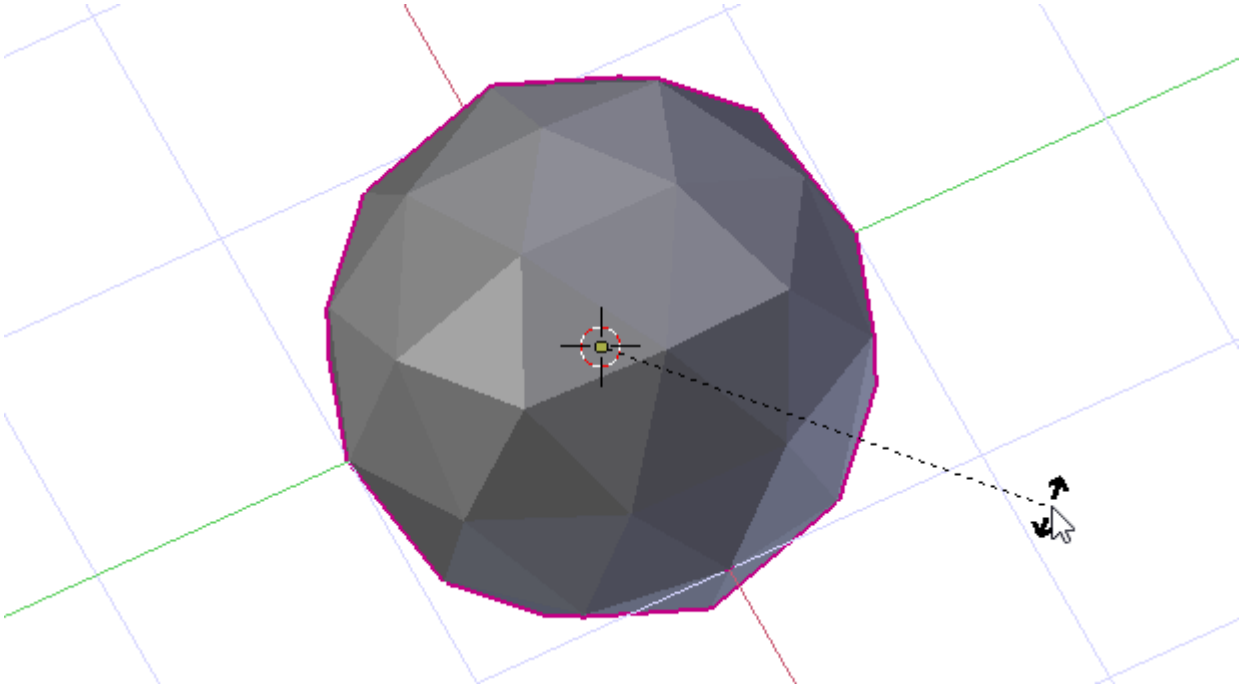

File Render Window Help Default Scene Blender Render v2.76 | Verts:8/8 | Edges:12/12 | Faces:6/6 | Tris:12 | Mem:23.34M | Cube
Transform
Translate
Rotate
Scale
Shrink/Fatten
Push/Pull
Mesh Tools
Deform:
Slide Ed Vertex
Noise
Smooth Vertex
Randomize
Add:
Extrude
Extrude Region
Extrude Individual
Inset Faces
Make Edge/Face
Toggle Editmode
User Ortho
(1) Cube
View Select Add Mesh Edit Mode Global
View Search All Scenes
Scene
RenderLayers
World
Cube
Cube.001
Cube.002
Cube.003
Cube.004
Cube.005
Cube.006
Finger
Ring
SDCard
Apply Copy
Operation: Object:
Union Cube.003
Boolean.003
Union Cube.004
Boolean.005
Union Cube.005
Boolean.004
Union Cube.006
View Marker Frame Playback Start: 1 End: 250 No Sync

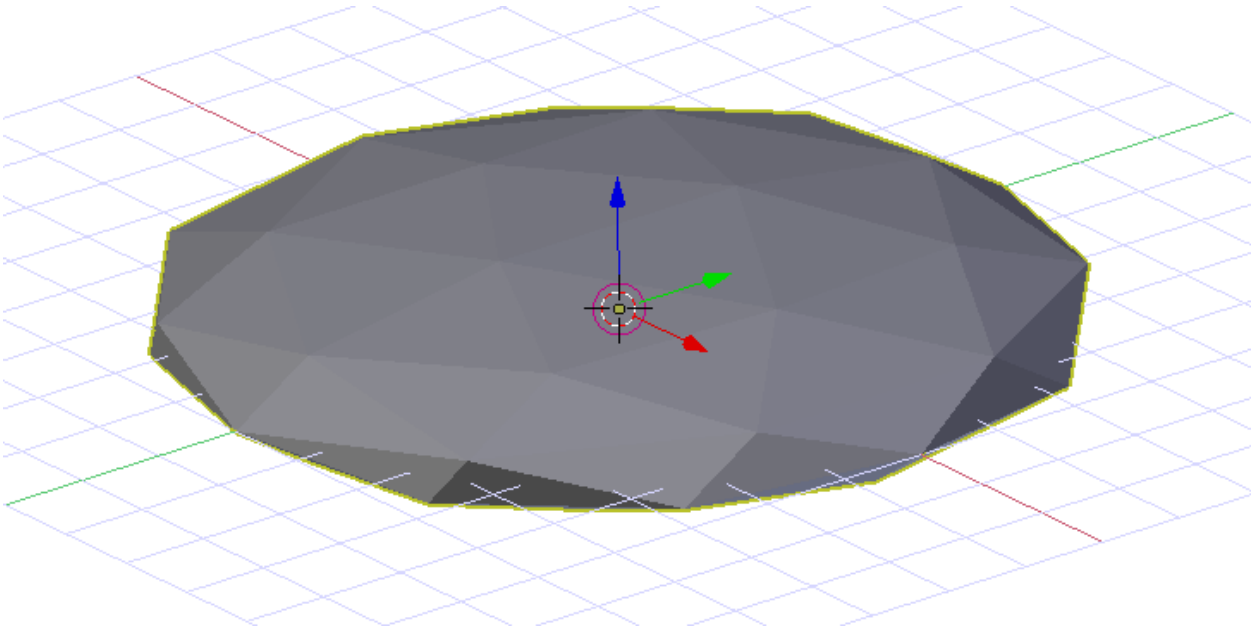


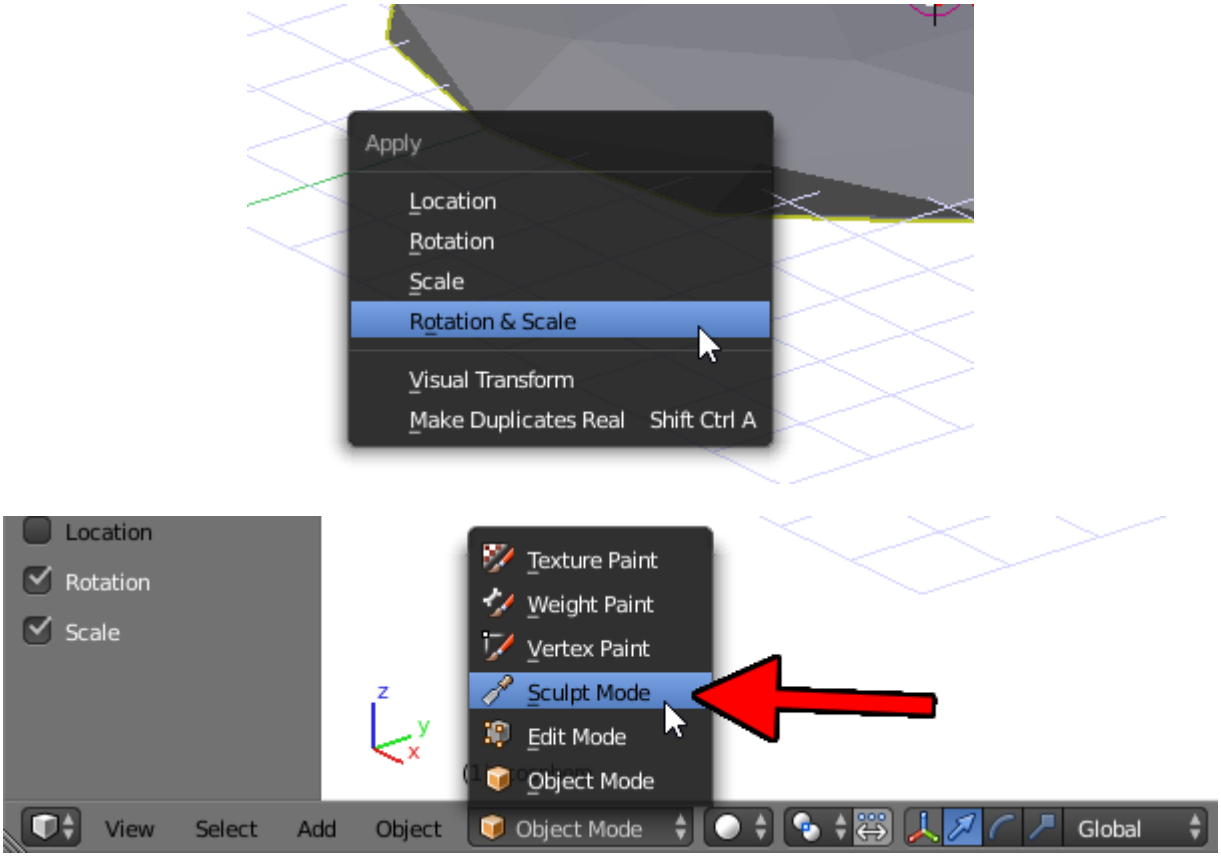
Chapter 6: Sculpting the Face of the Sun

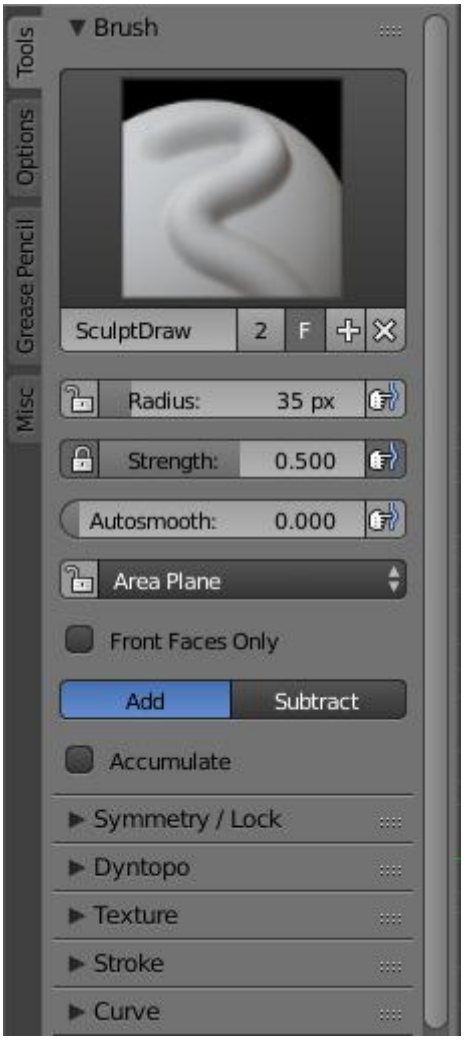




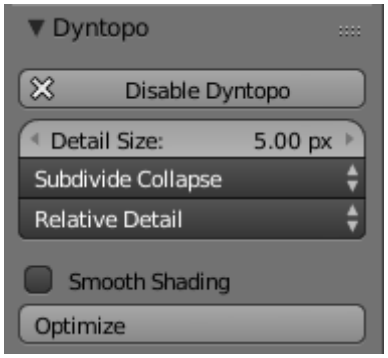


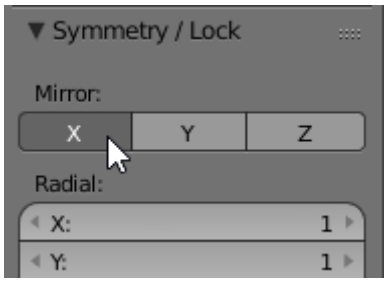


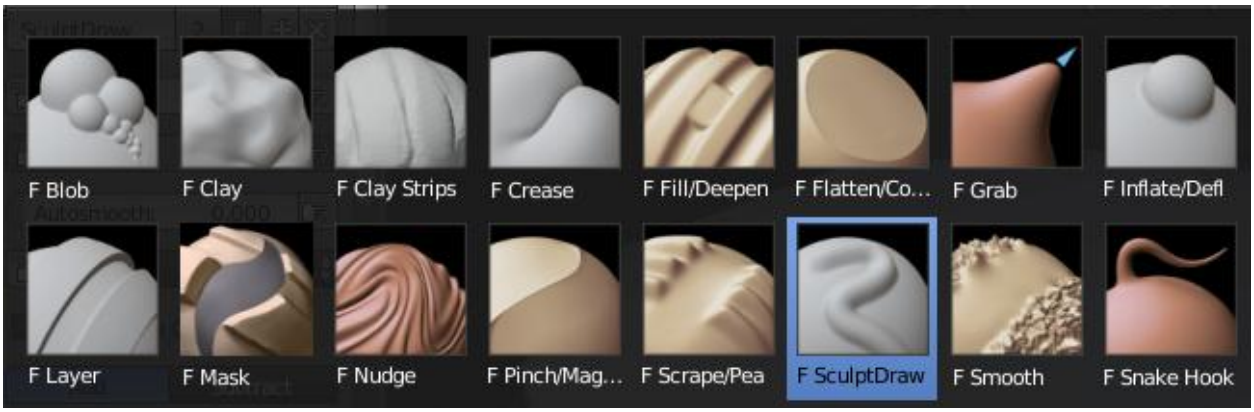

Apply
Location
Rotation
Scale
Rotation & Scale
Visual Transform
Make Duplicates Real Shift Ctrl A
Location
Rotation
Scale
Texture Paint
Weight Paint
Vertex Paint
Sculpt Mode
Edit Mode
Object Mode
z
y
x
View
Select
Add
Object
Object Mode
Global

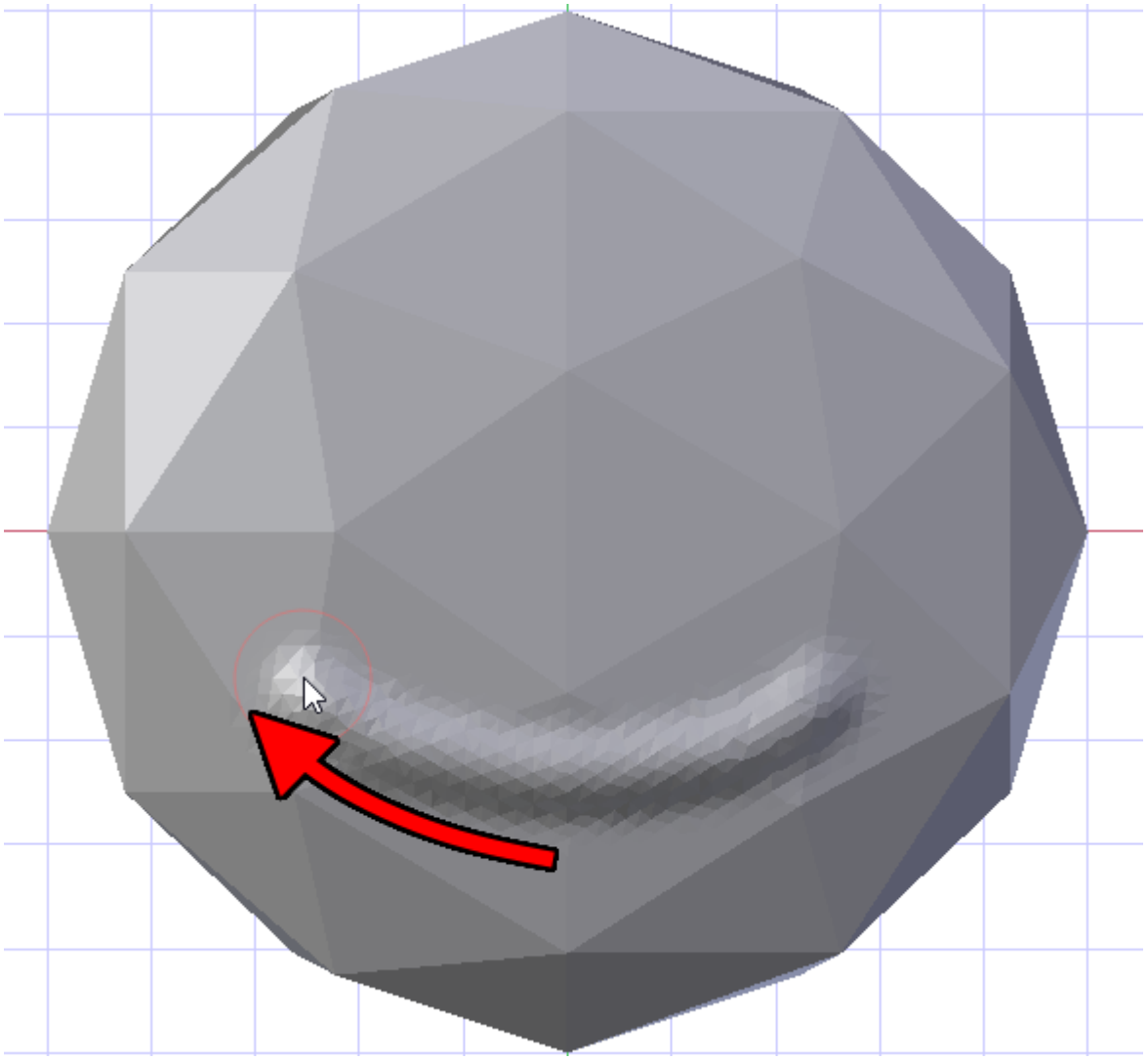

Tools
Options
Grease Pencil
Misc
▼ Brush
SculptDraw
2
F
Radius: 35 px
Strength: 0.500
Autosmooth: 0.000
Area Plane
Front Faces Only
Add
Subtract
Accumulate
▶ Symmetry / Lock
▶ Dyntopo
▶ Texture
▶ Stroke
▶ Curve

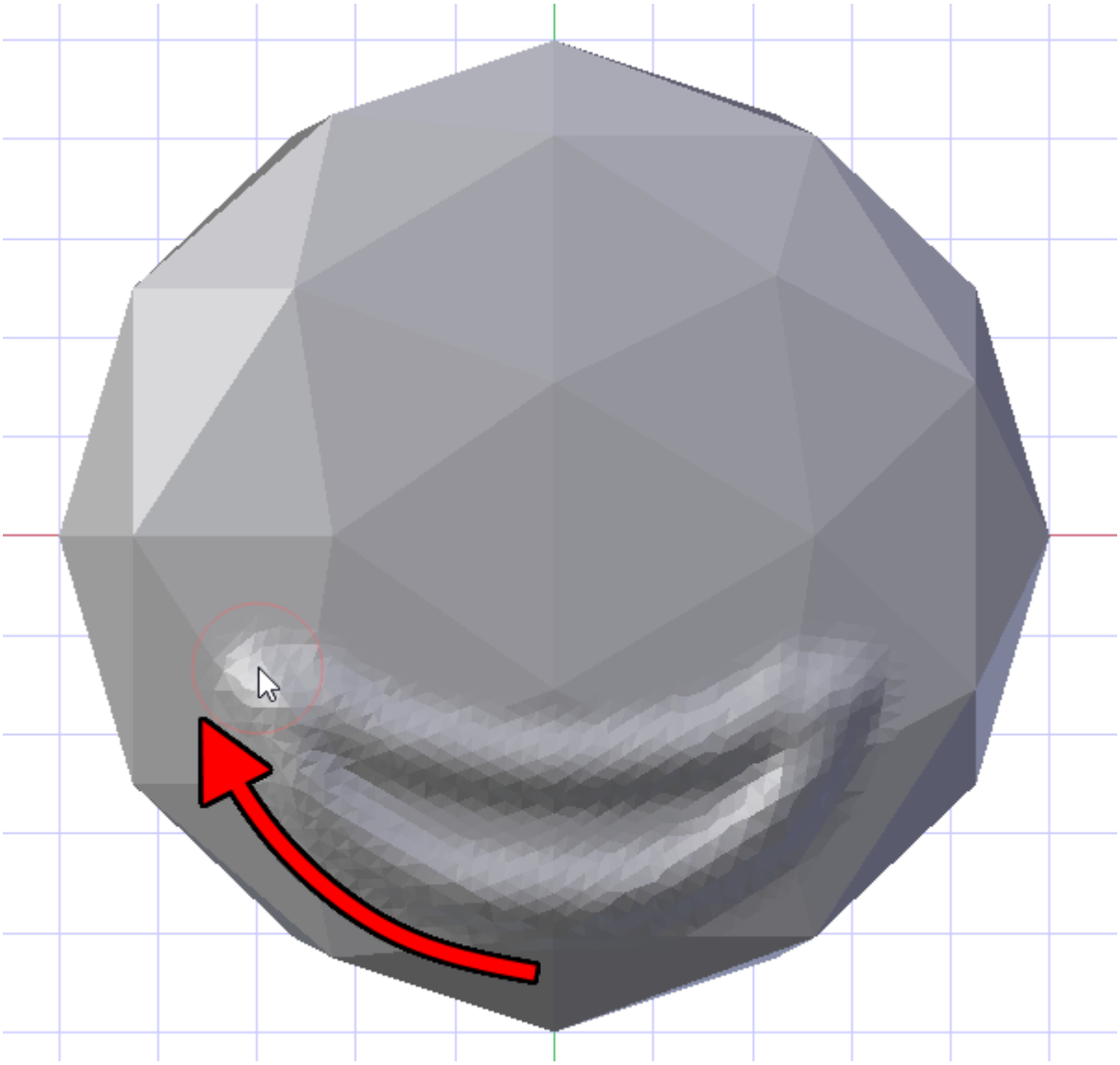
▼ Dyntopo
Enable Dyntopo
Detail Size: 12.00 px
Subdivide Collapse
Relative Detail
Smooth Shading
Optimize
Direction -X to +X
Symmetrize


Dyntopo
Disable Dyntopo
Detail Size: 5.00 px
Subdivide Collapse
Relative Detail
Smooth Shading
Optimize

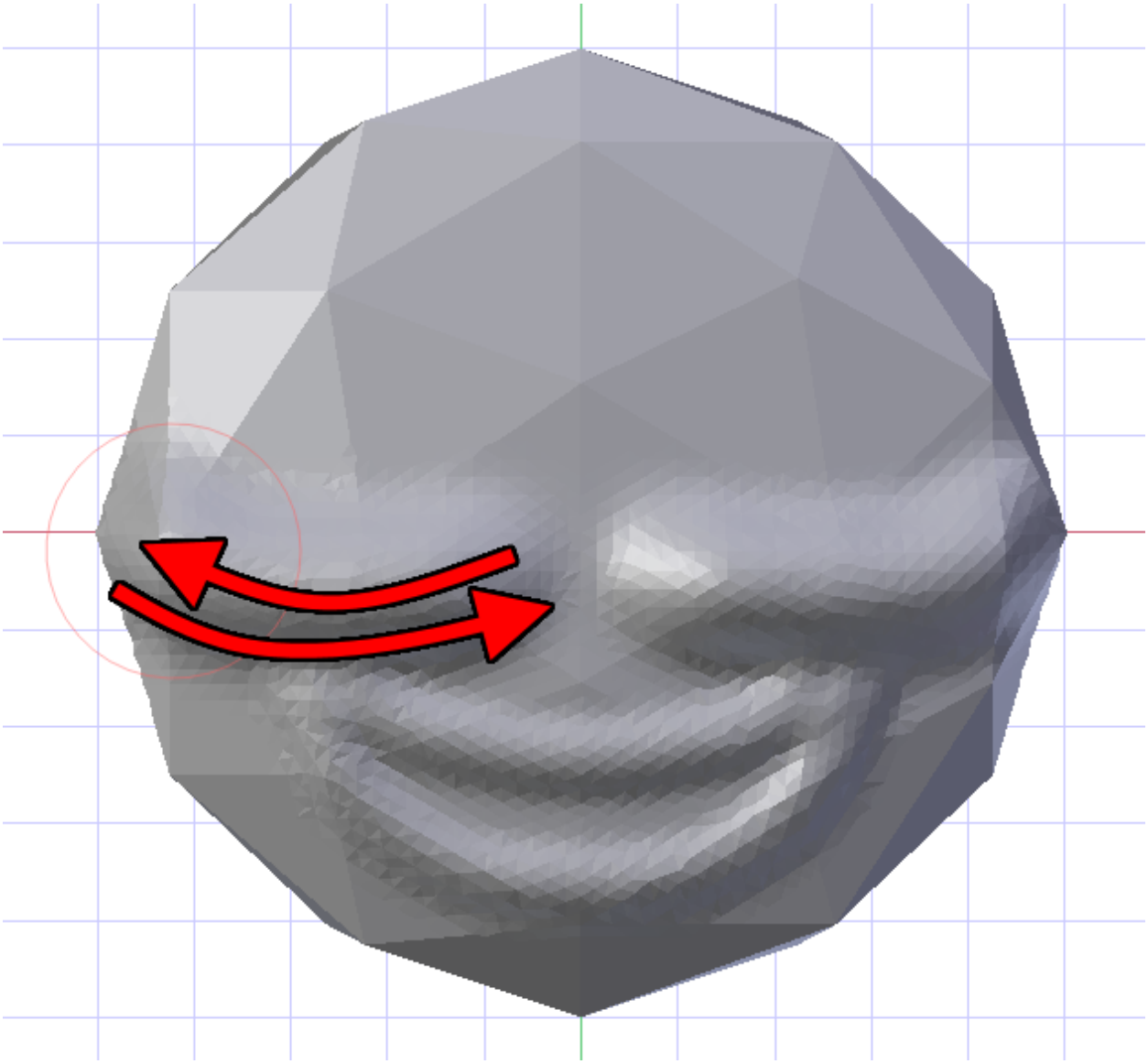

Symmetry / Lock
Mirror:
X
Y
Z
Radial:
X: 1
Y: 1

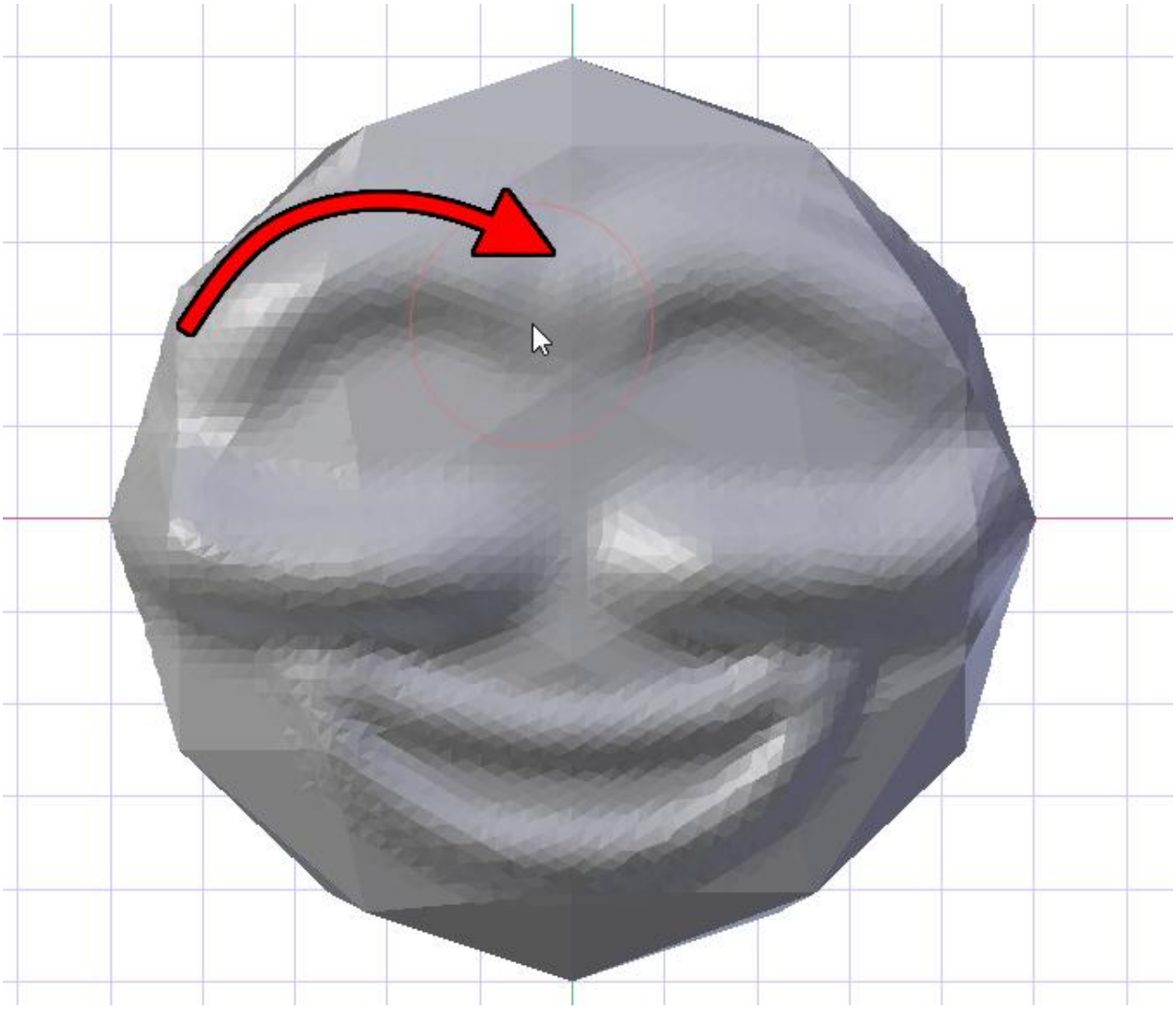

F Blob
F Clay
F Clay Strips
F Crease
F Fill/Deepen
F Flatten/Co...
F Grab
F Inflate/Defl
F Layer
F Mask
F Nudge
F Pinch/Mag...
F Scrape/Pea
F SculptDraw
F Smooth
F Snake Hook

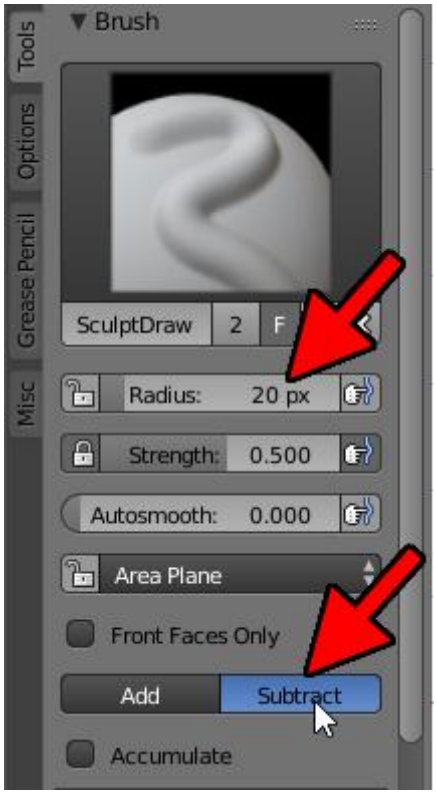


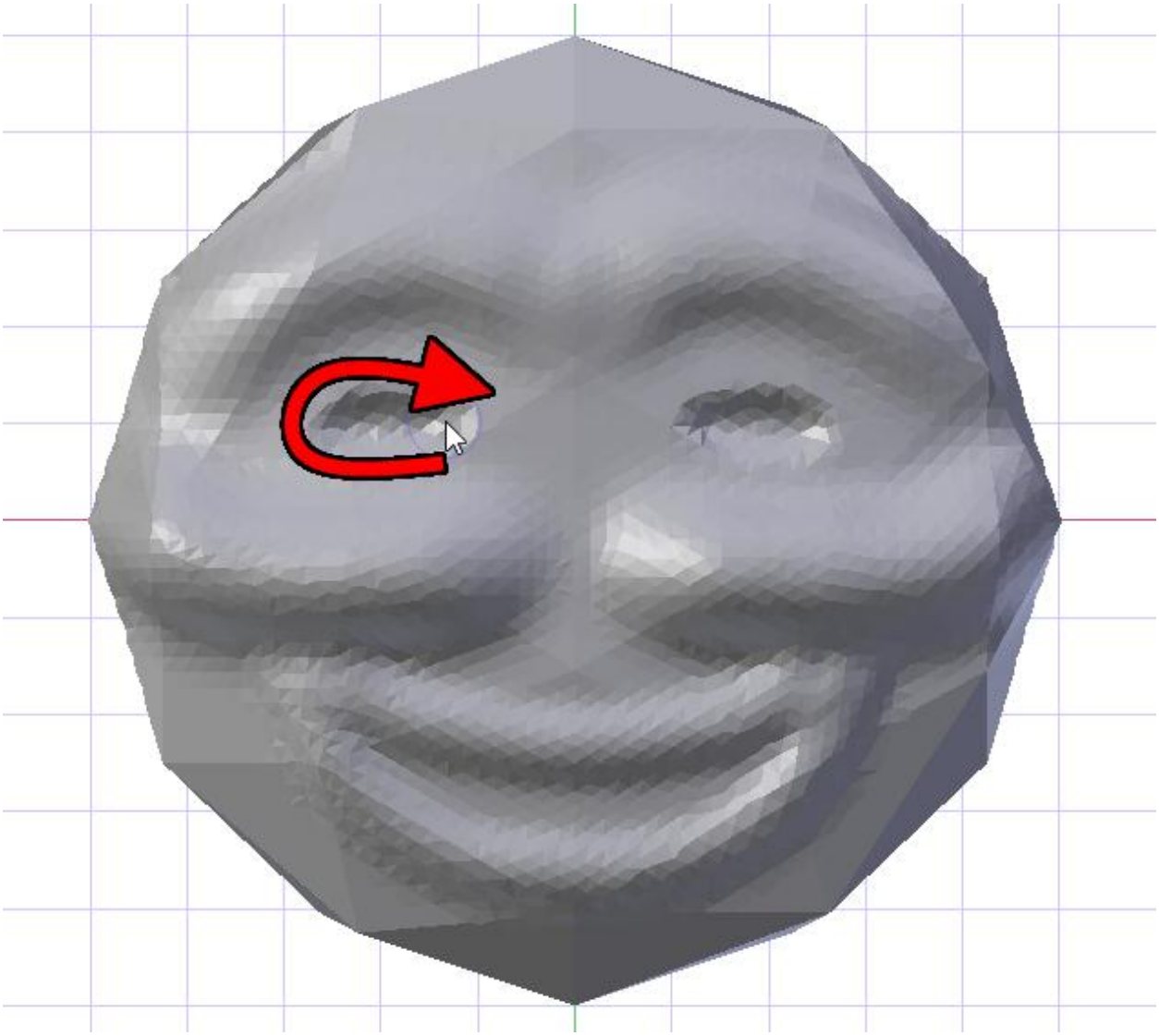


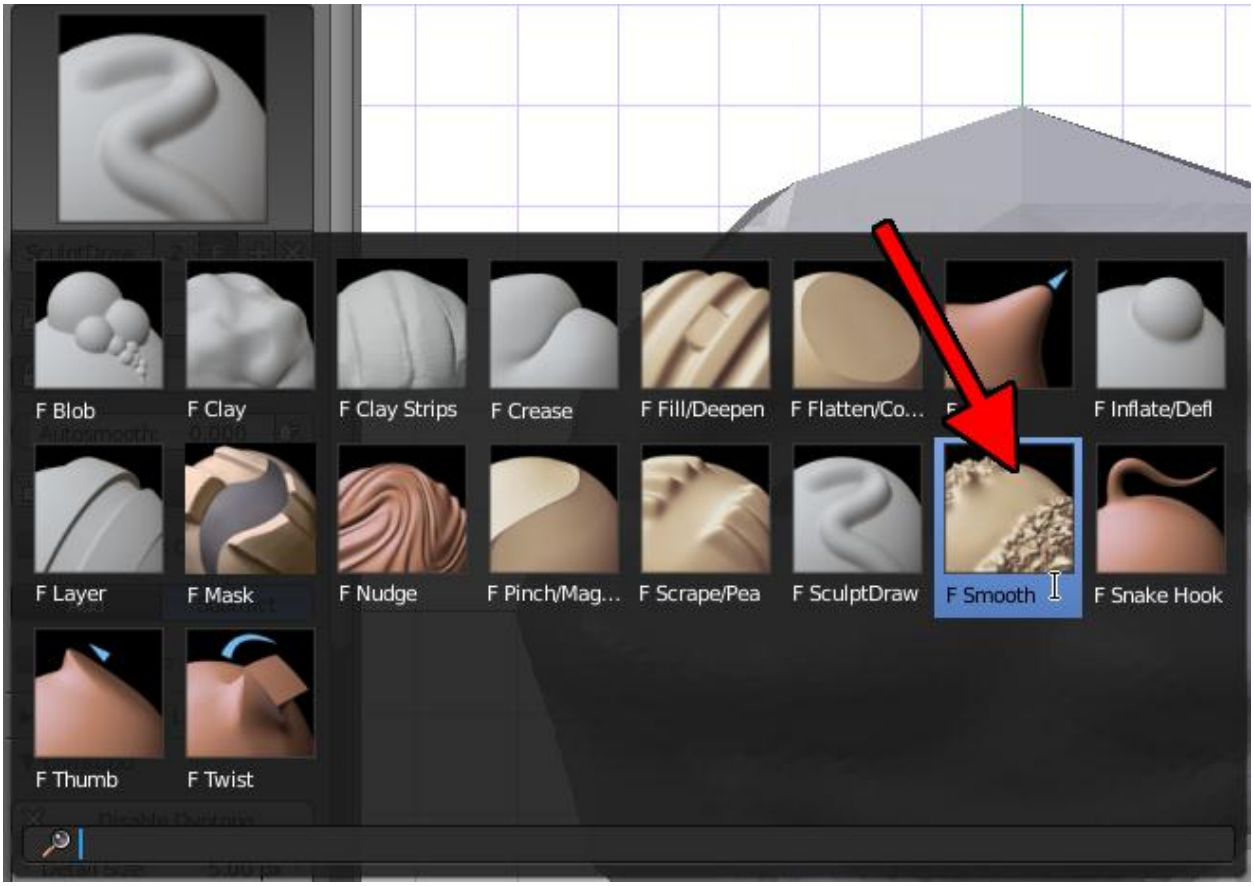
Brush
SculptDraw
2
Radius:
70 px
Strength:
0.500

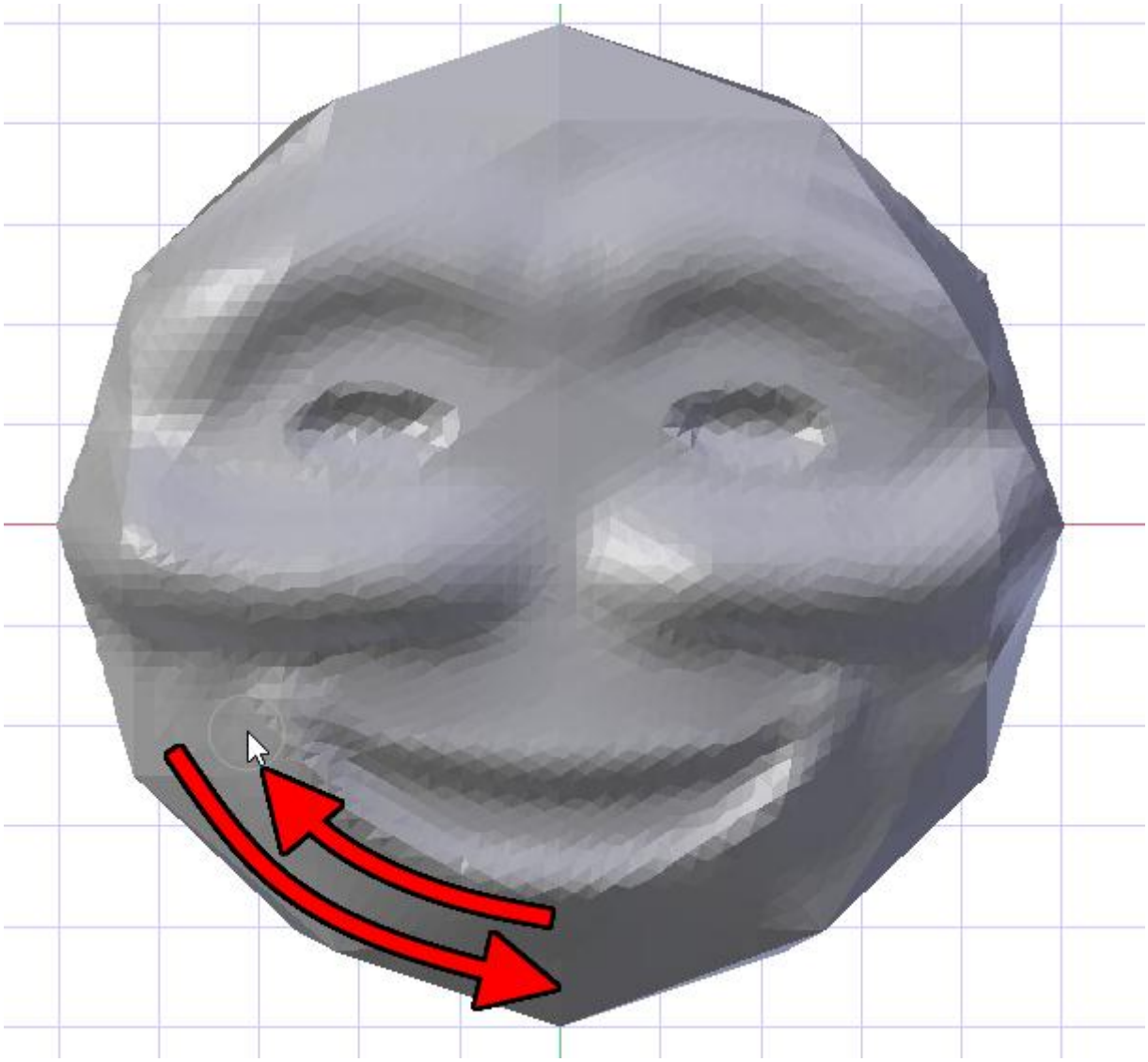


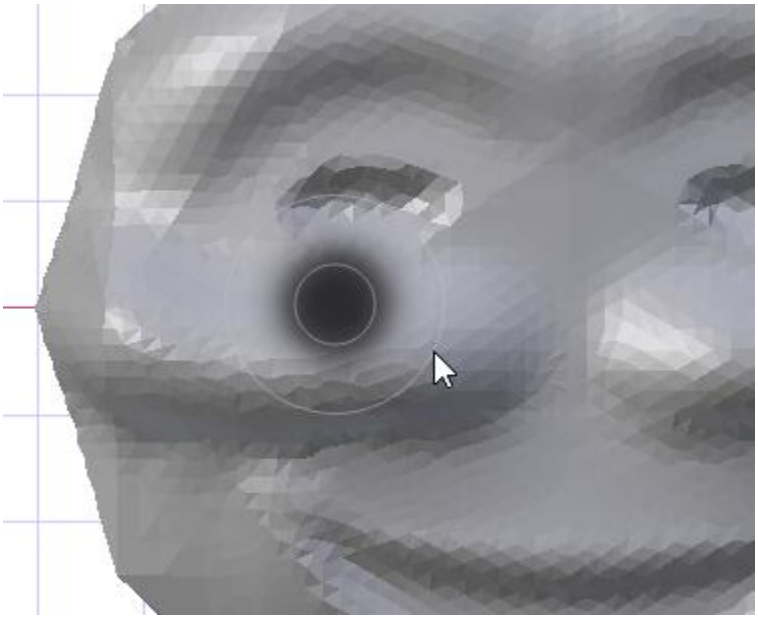


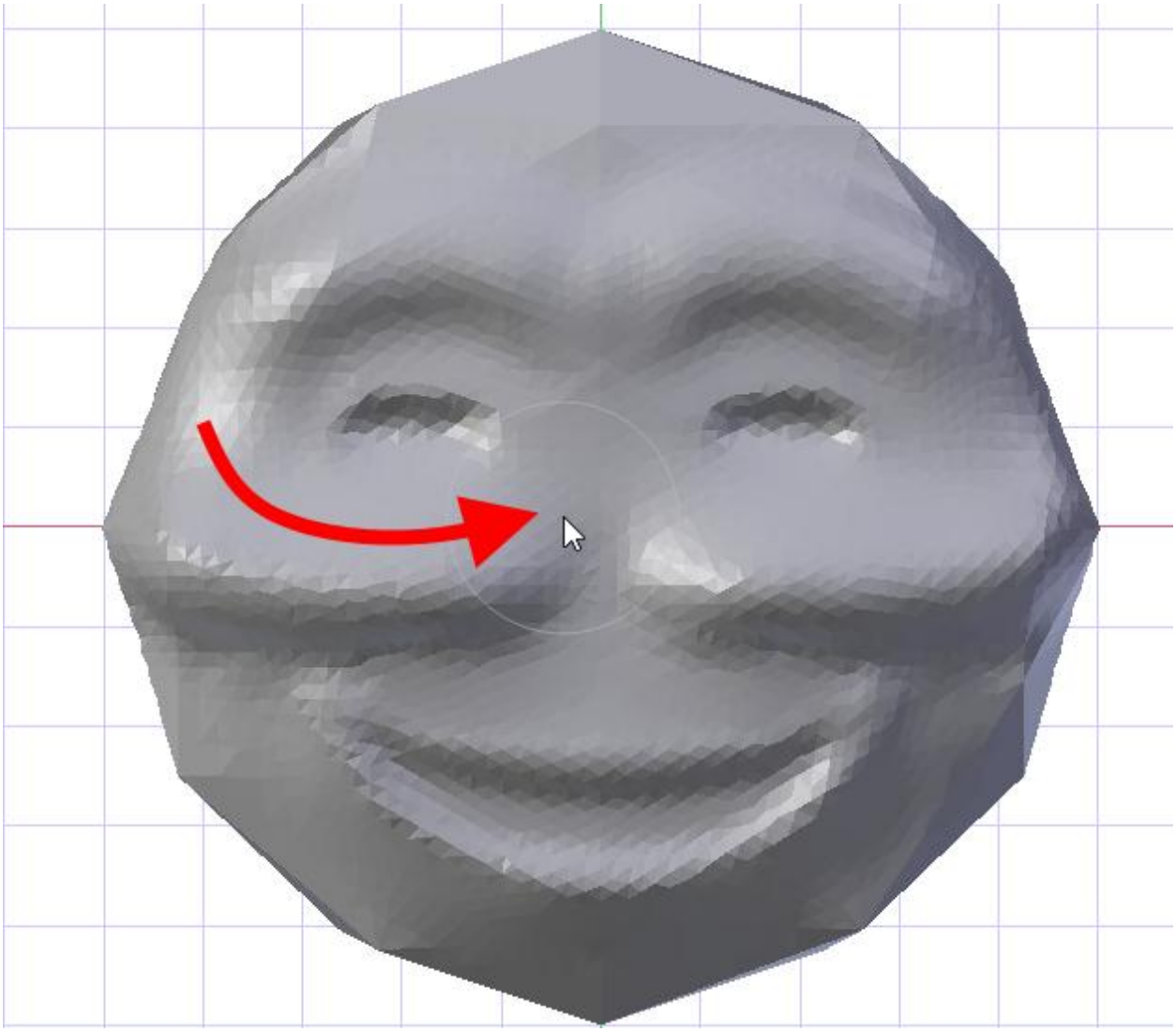

Brush
Tools
Options
Grease Pencil
Misc
SculptDraw
2
F
Radius: 20 px
Strength: 0.500
Autosmooth: 0.000
Area Plane
Front Faces Only
Add
Subtract
Accumulate

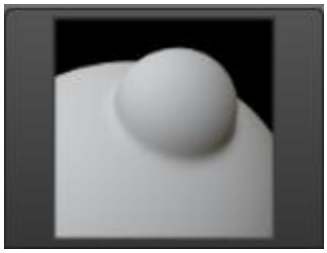


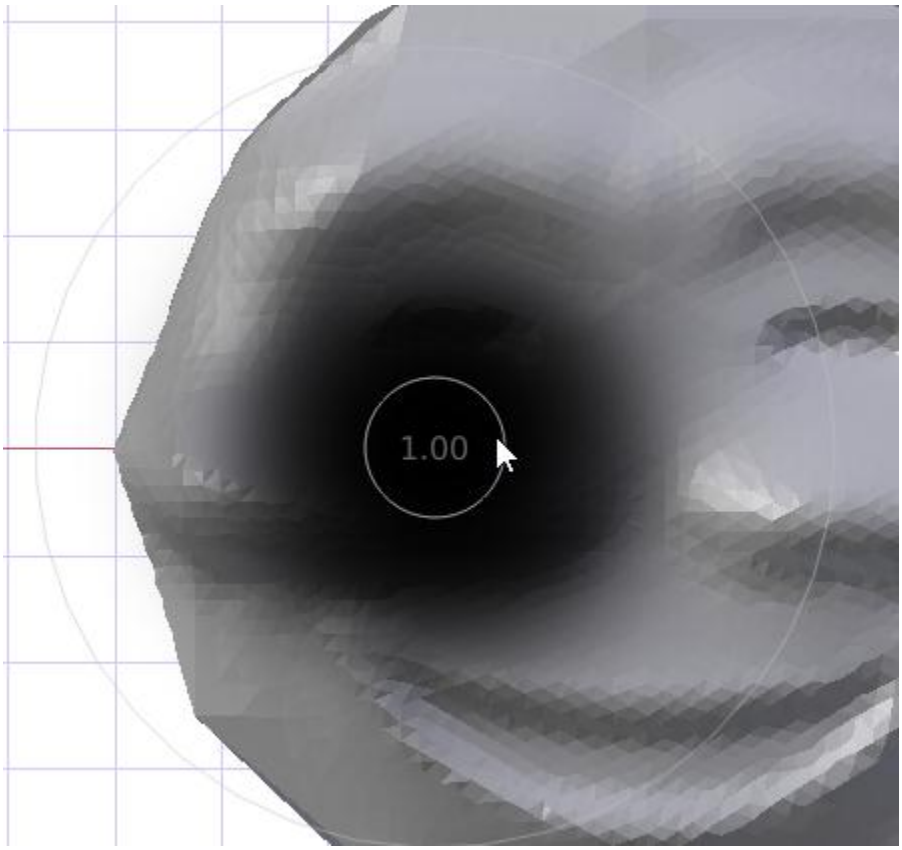

F Blob
F Clay
F Clay Strips
F Crease
F Fill/Deepen
F Flatten/Co...
F Inflate/Defl
F Layer
F Mask
F Nudge
F Pinch/Mag...
F Scrape/Pea
F SculptDraw
F Smooth
F Snake Hook
F Thumb
F Twist







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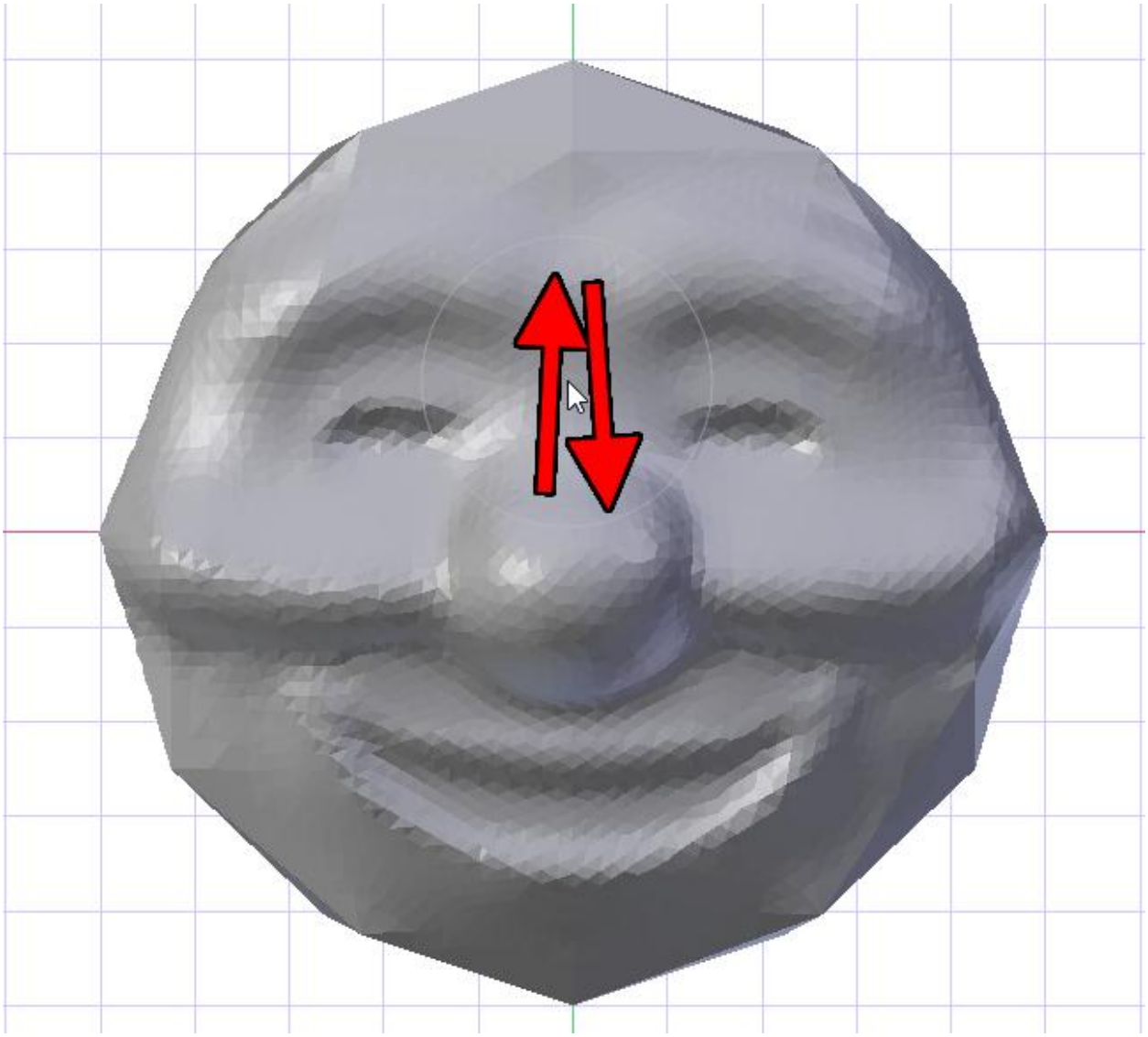

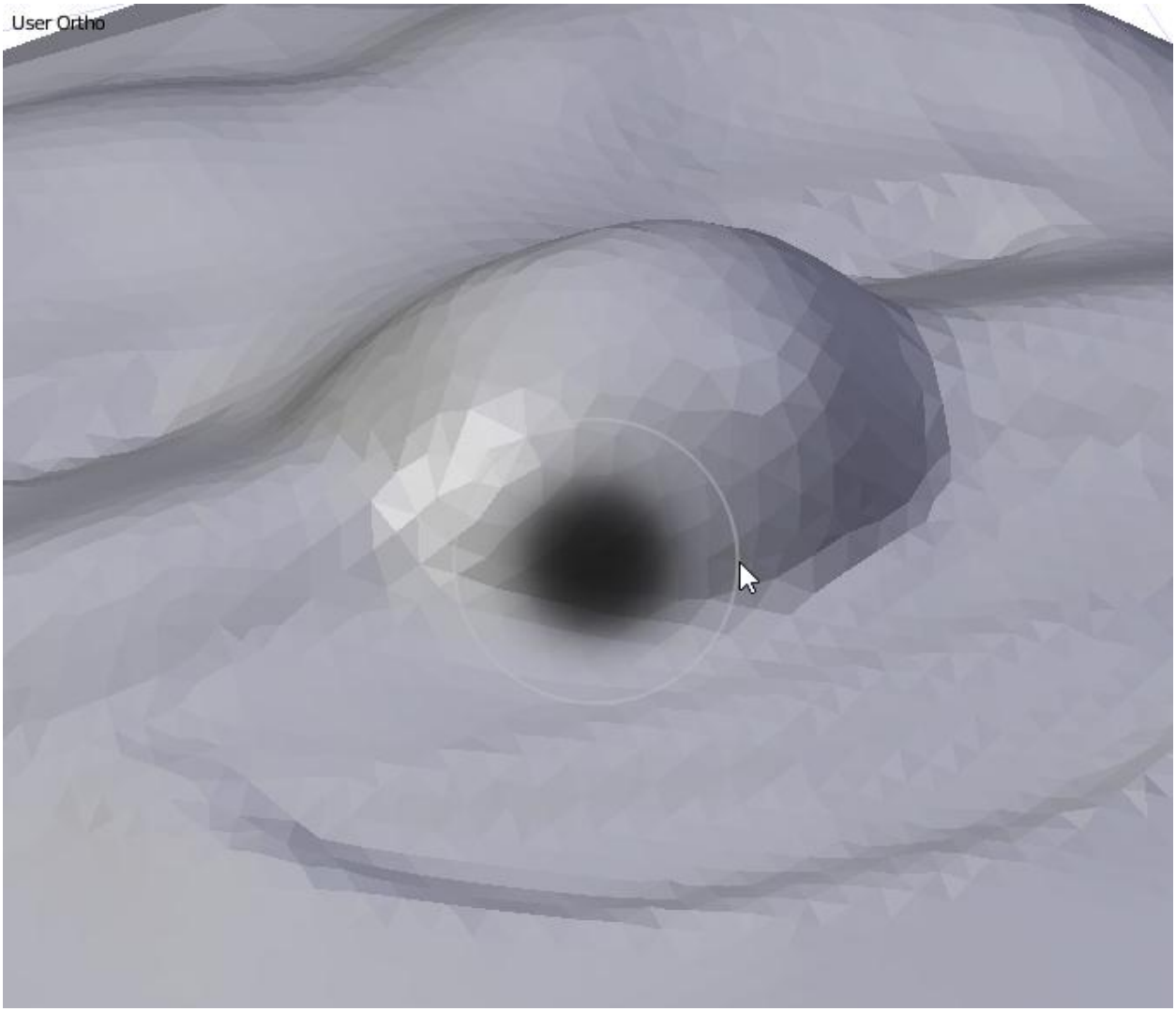
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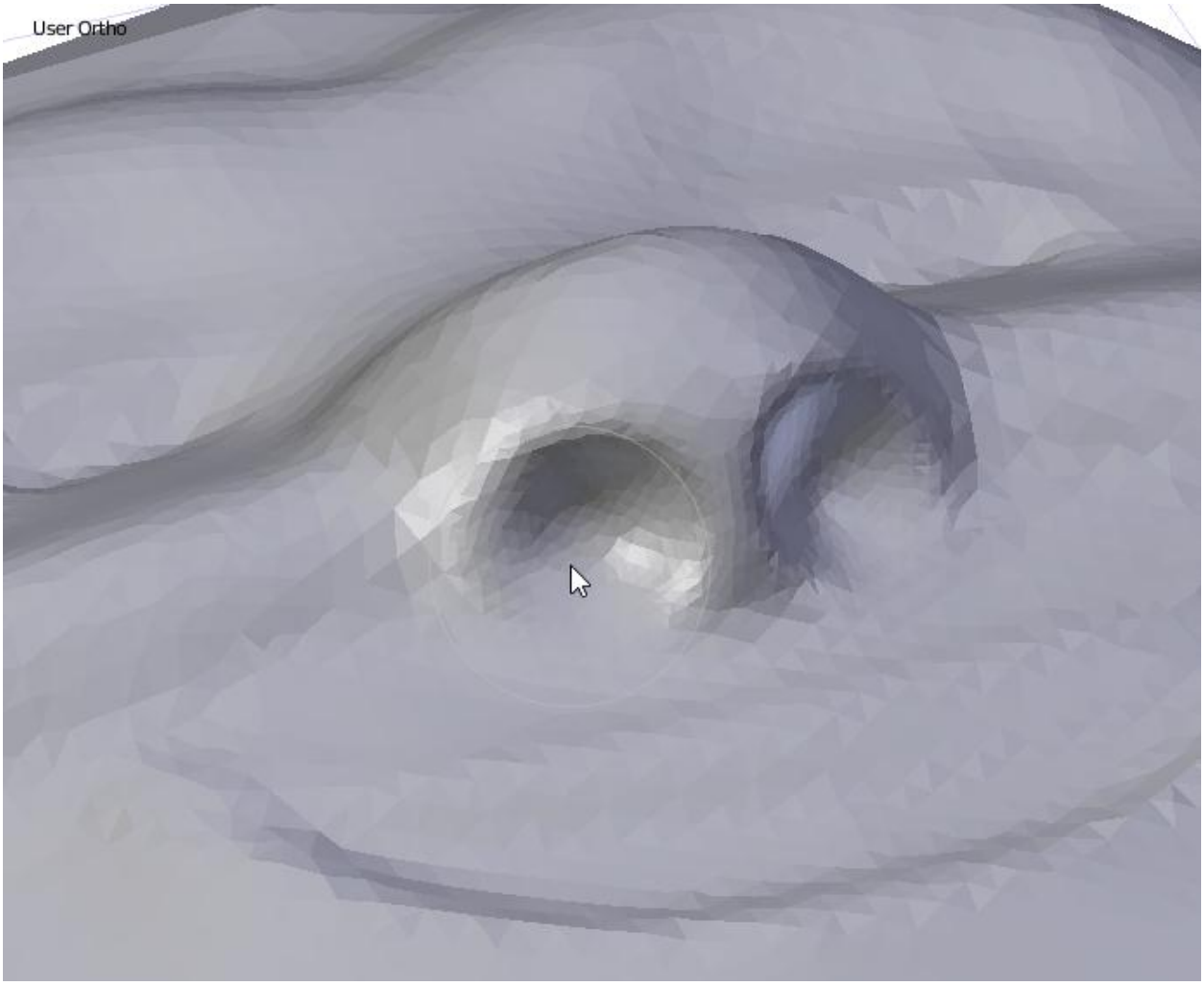
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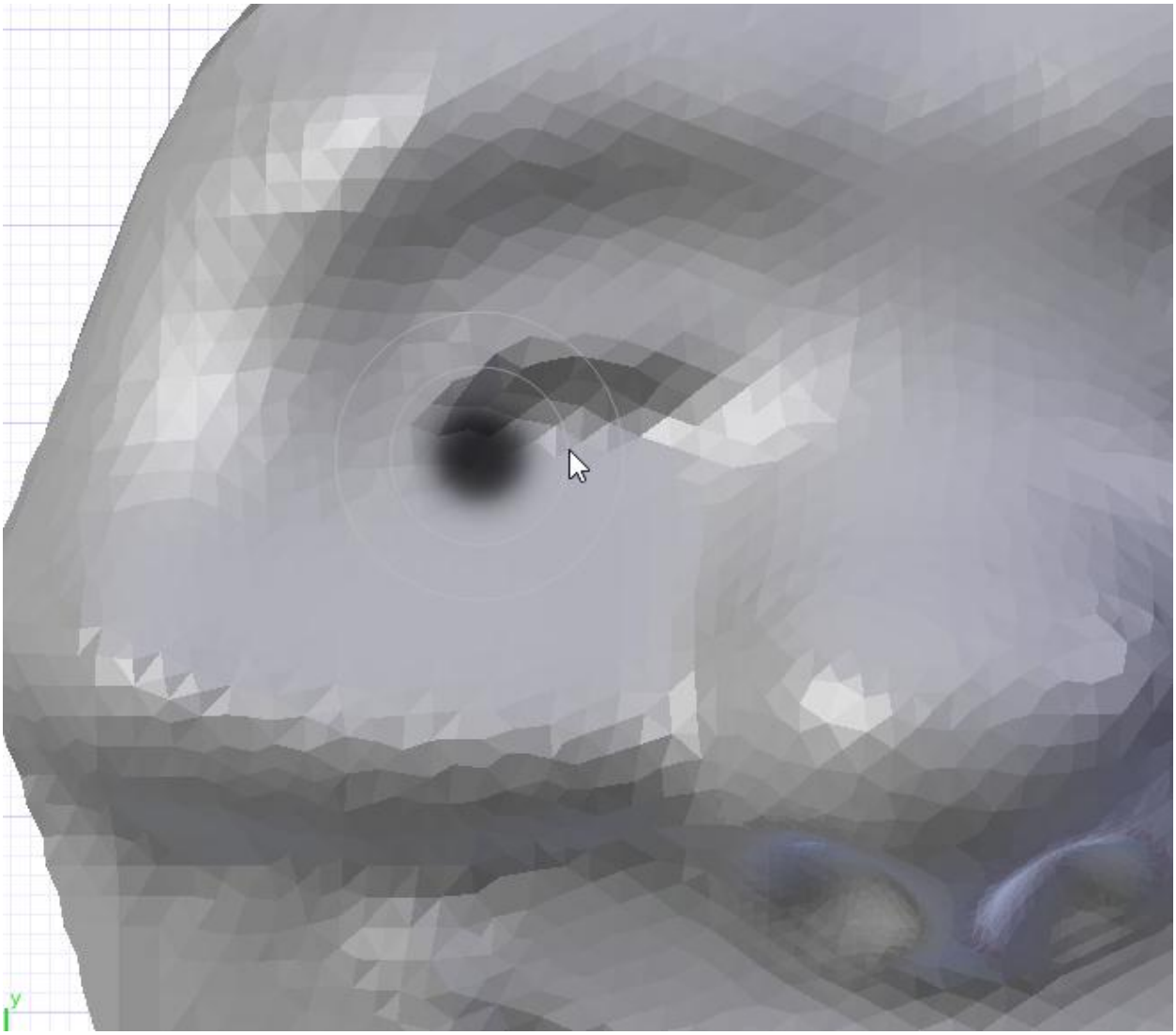
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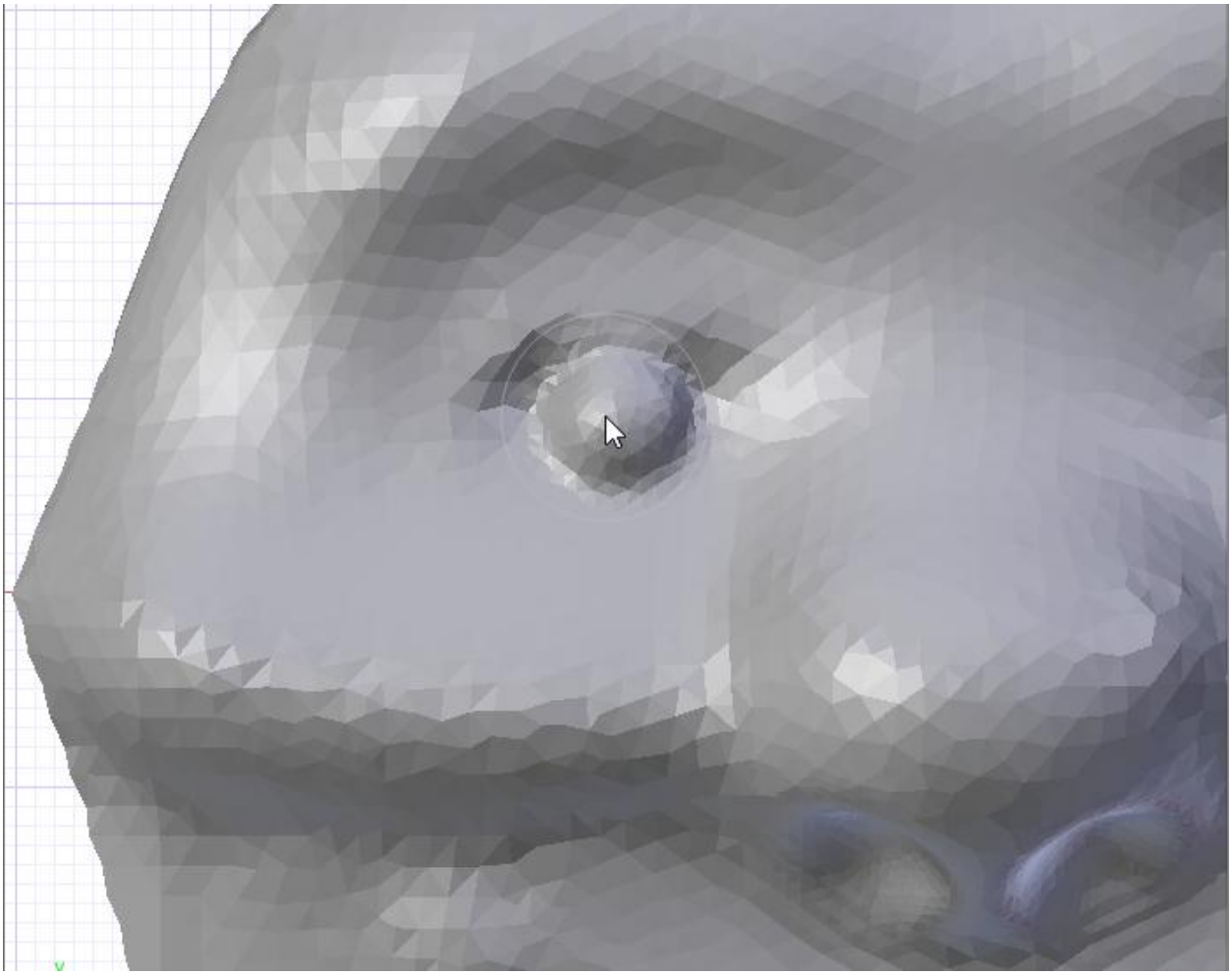

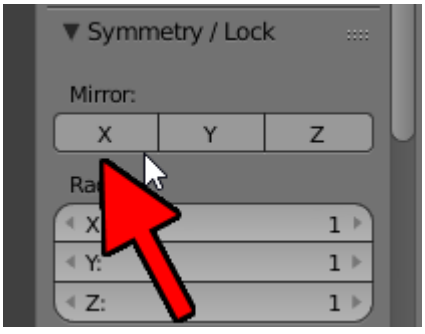
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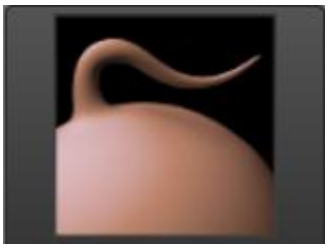
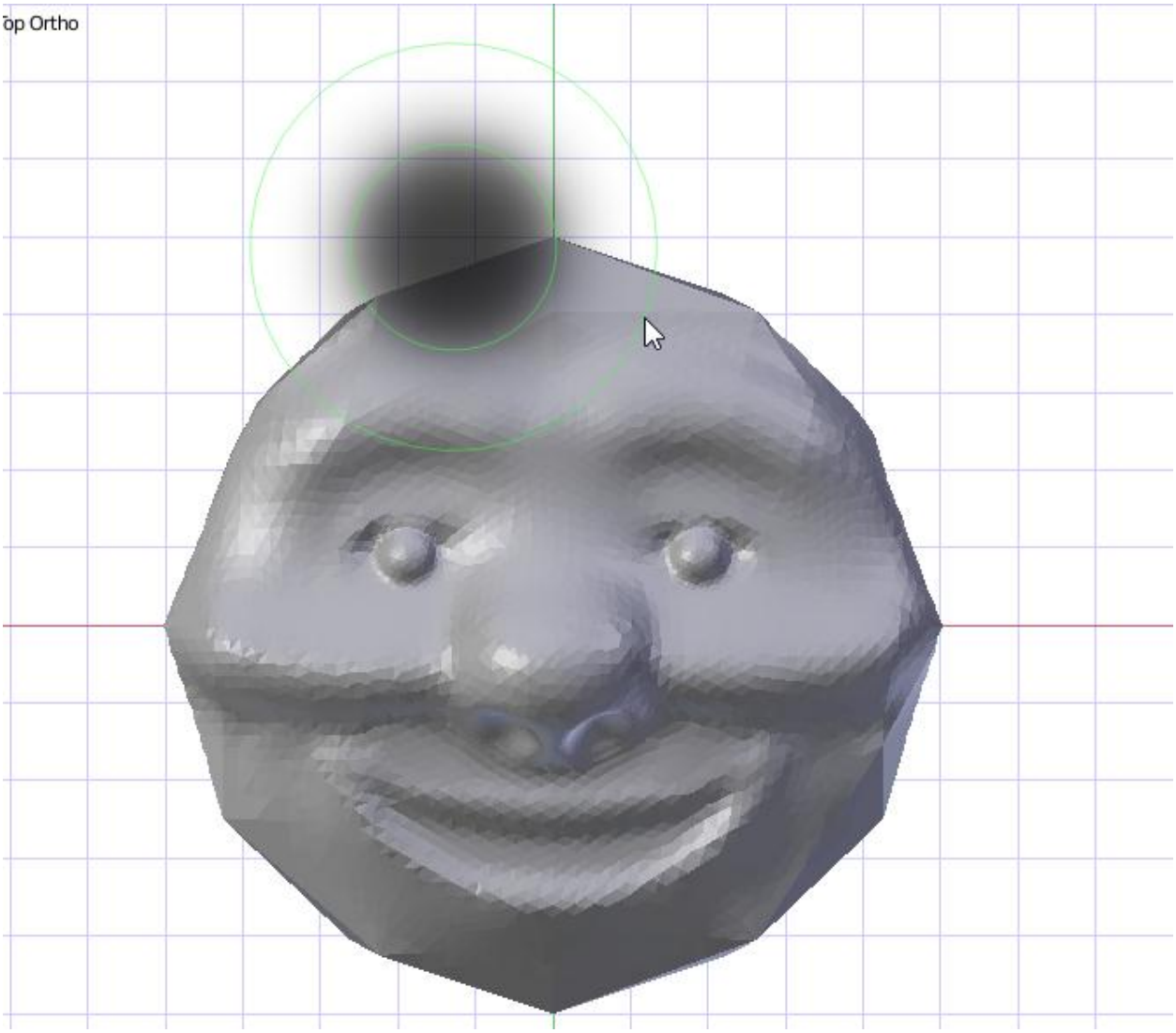
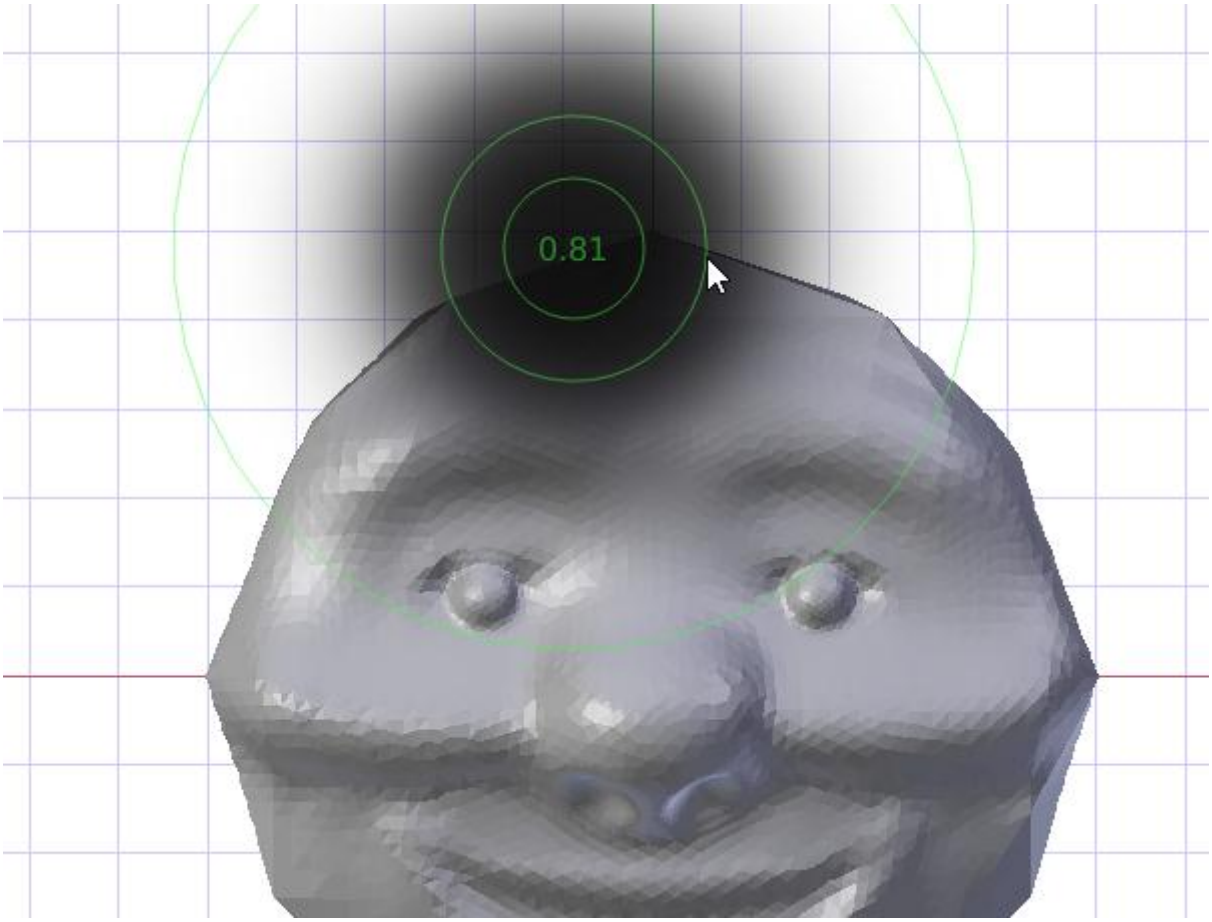
Mirror:
X
Y
Z
1
1
1




op Ortho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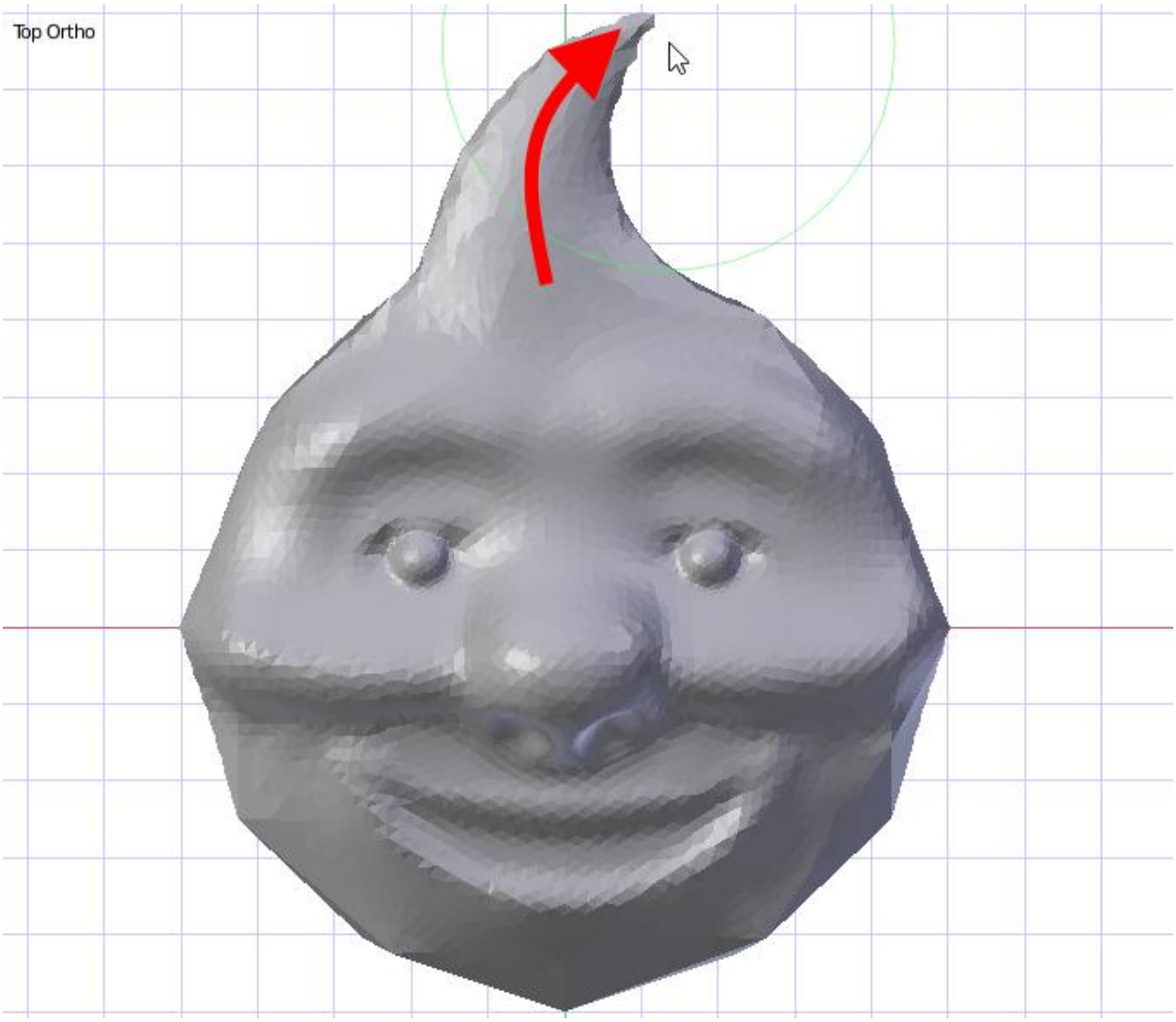
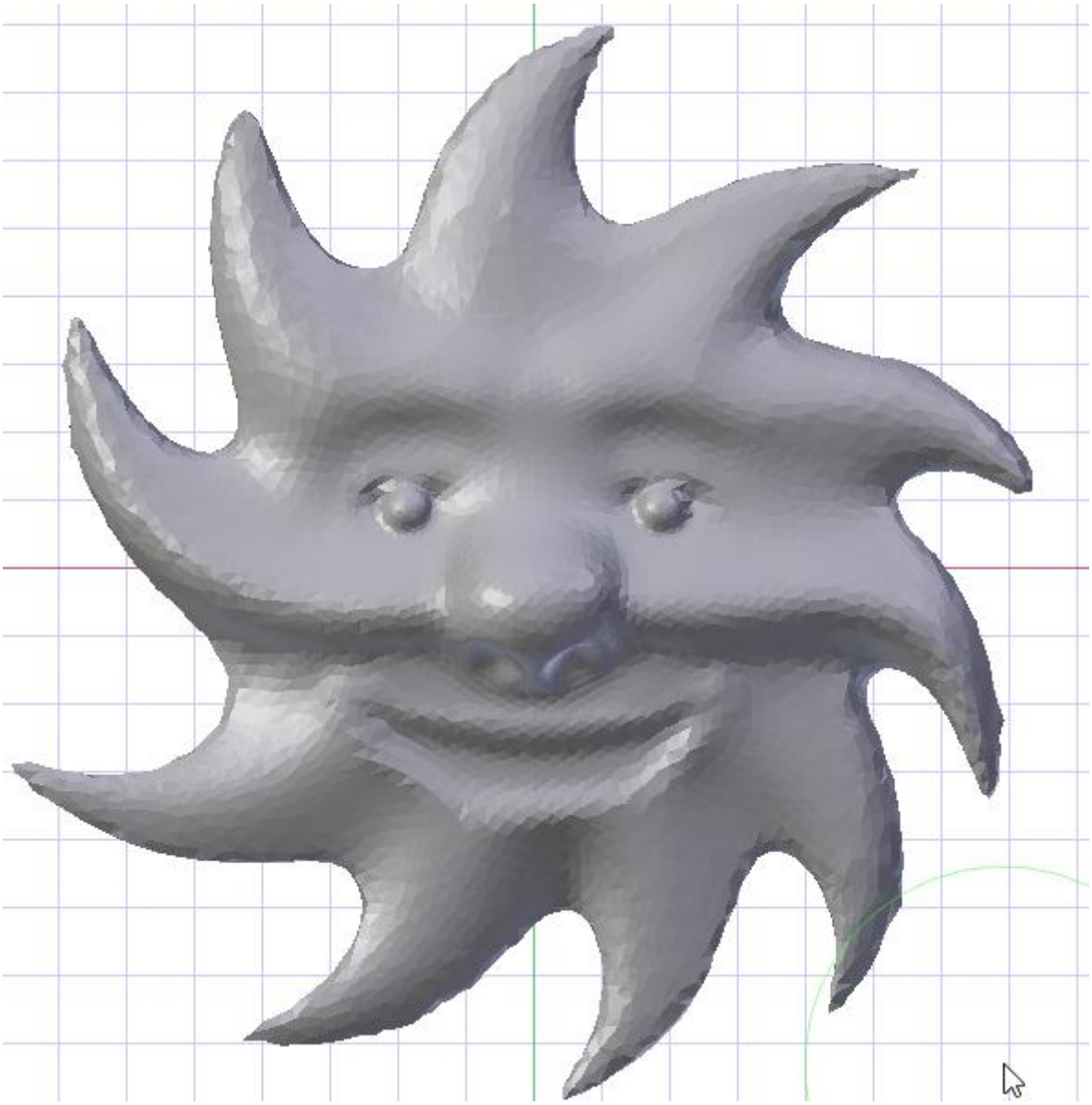
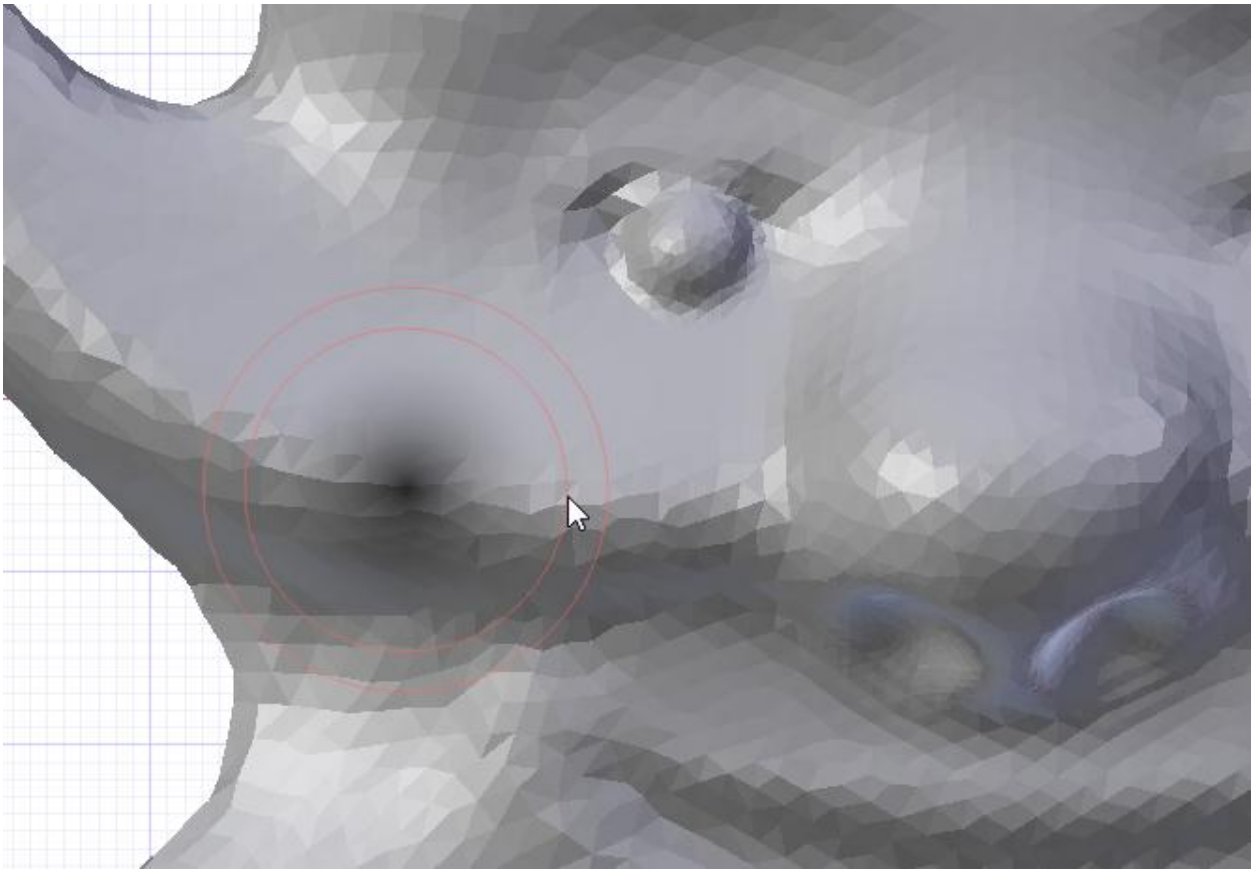
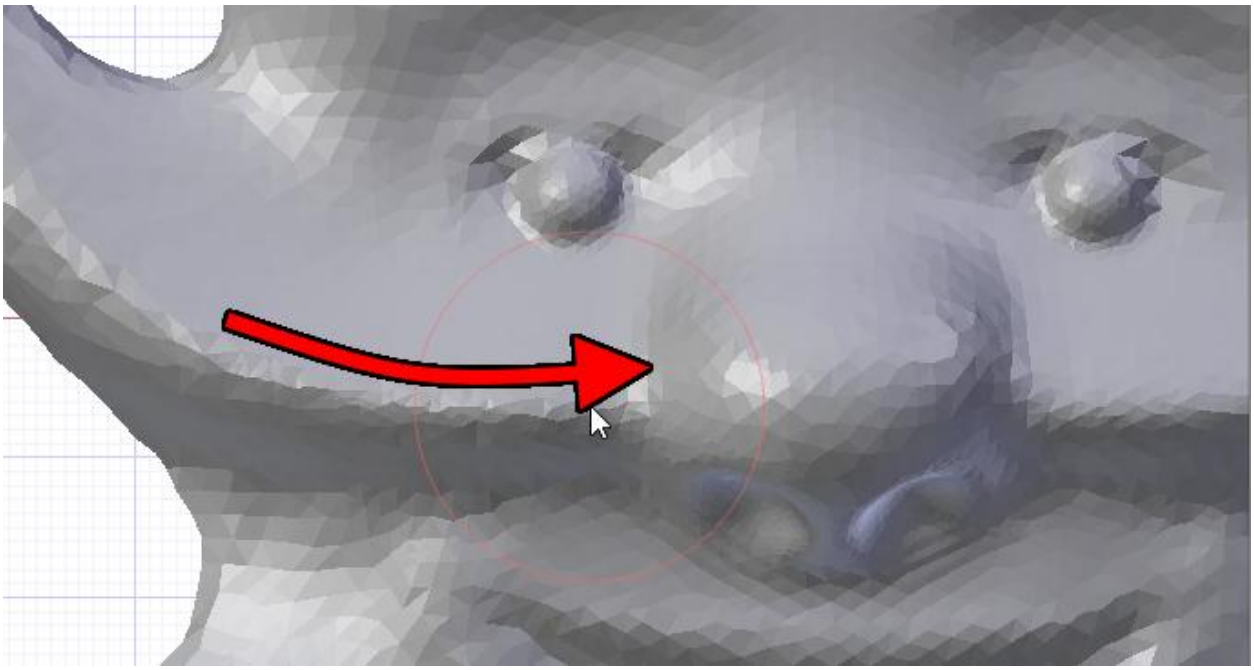

Top Ortho



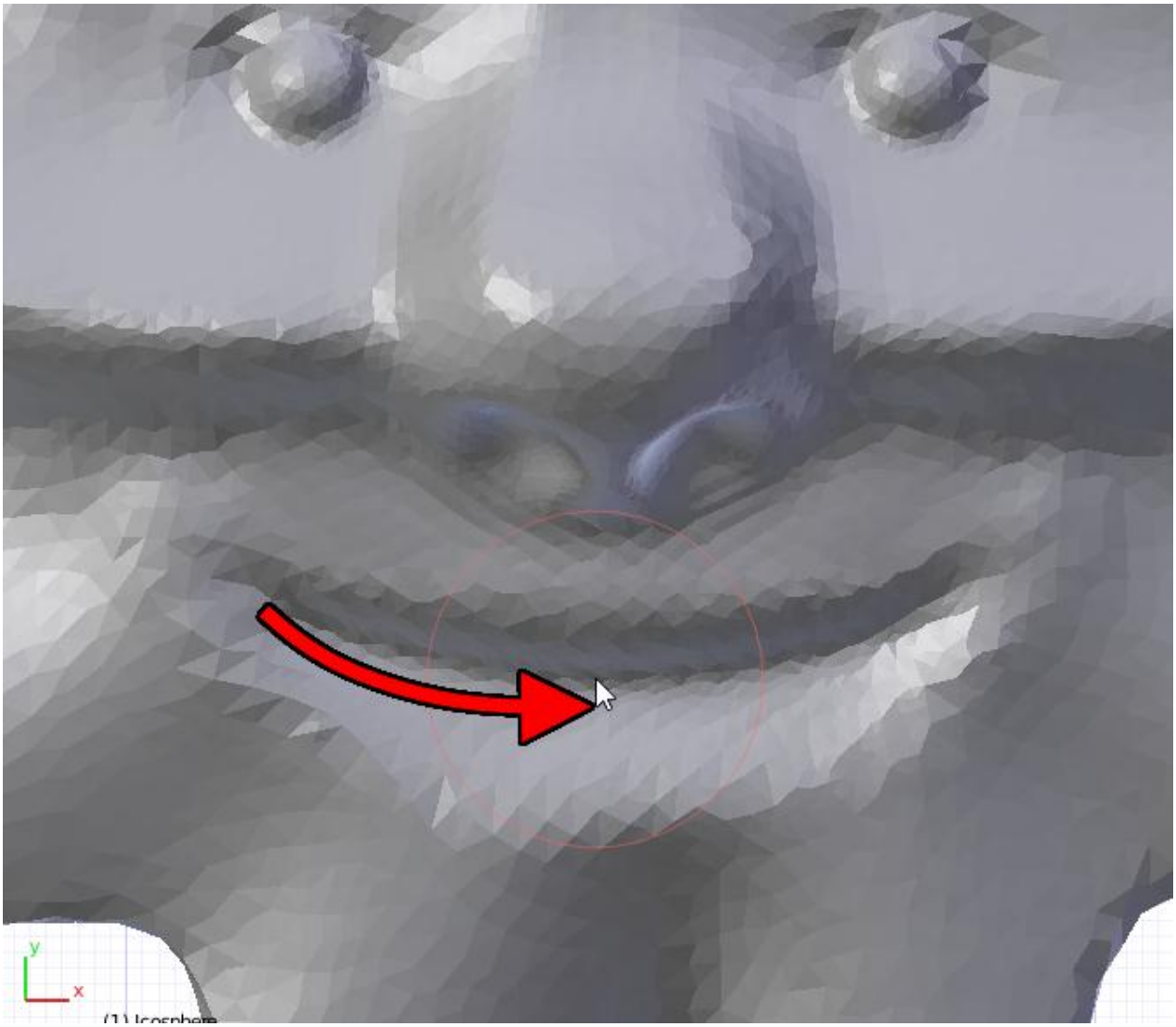
Symmetry / Lock
Mirror:
X
Y
Z
X: 1
Y: 1
Z: 1

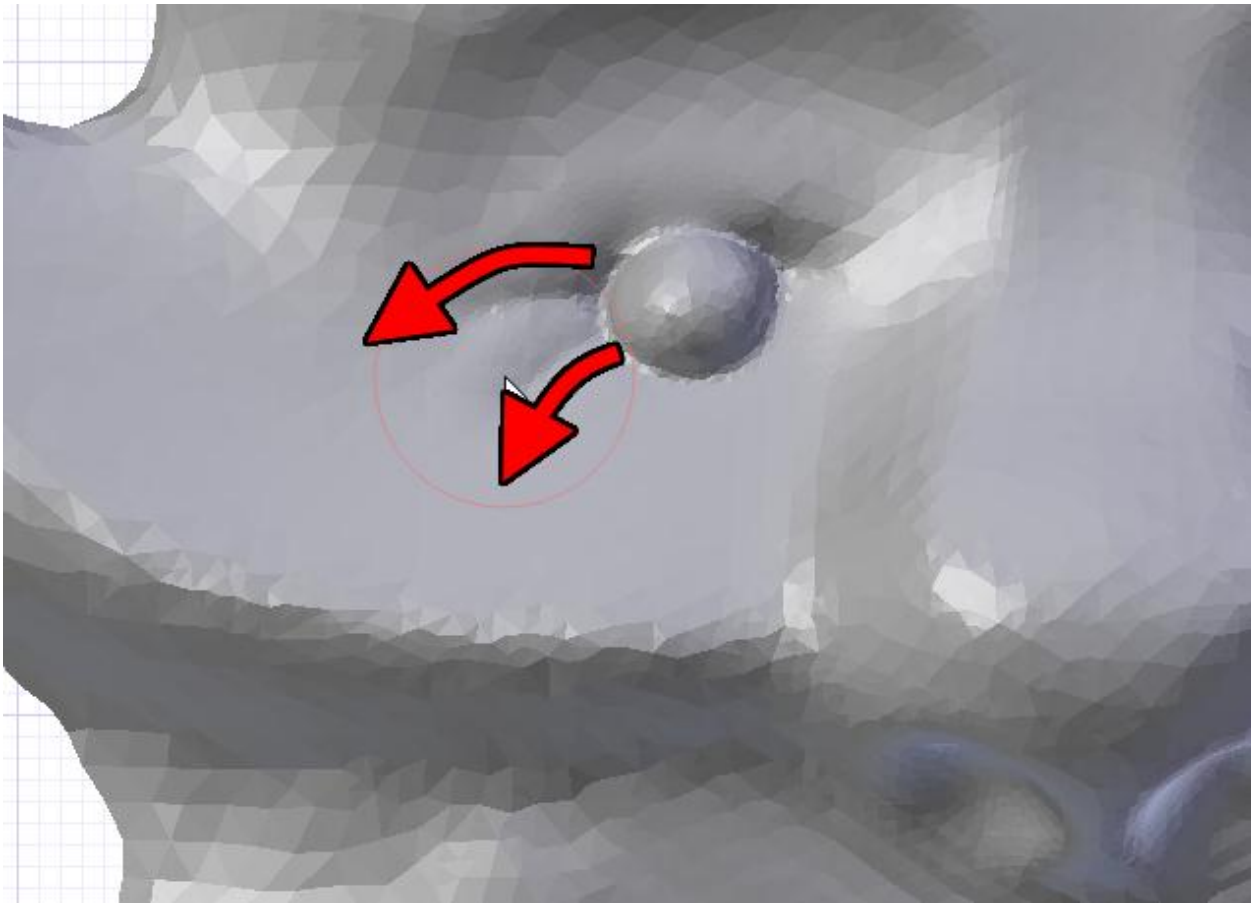
Brush
Tools
Options
Grease Pencil
Misc
Crease
2
F
Radius: 108 px
Strength: 0.250
Autosmooth: 0.000
0.500
Faces Only
Add
Subtract
Accumulate

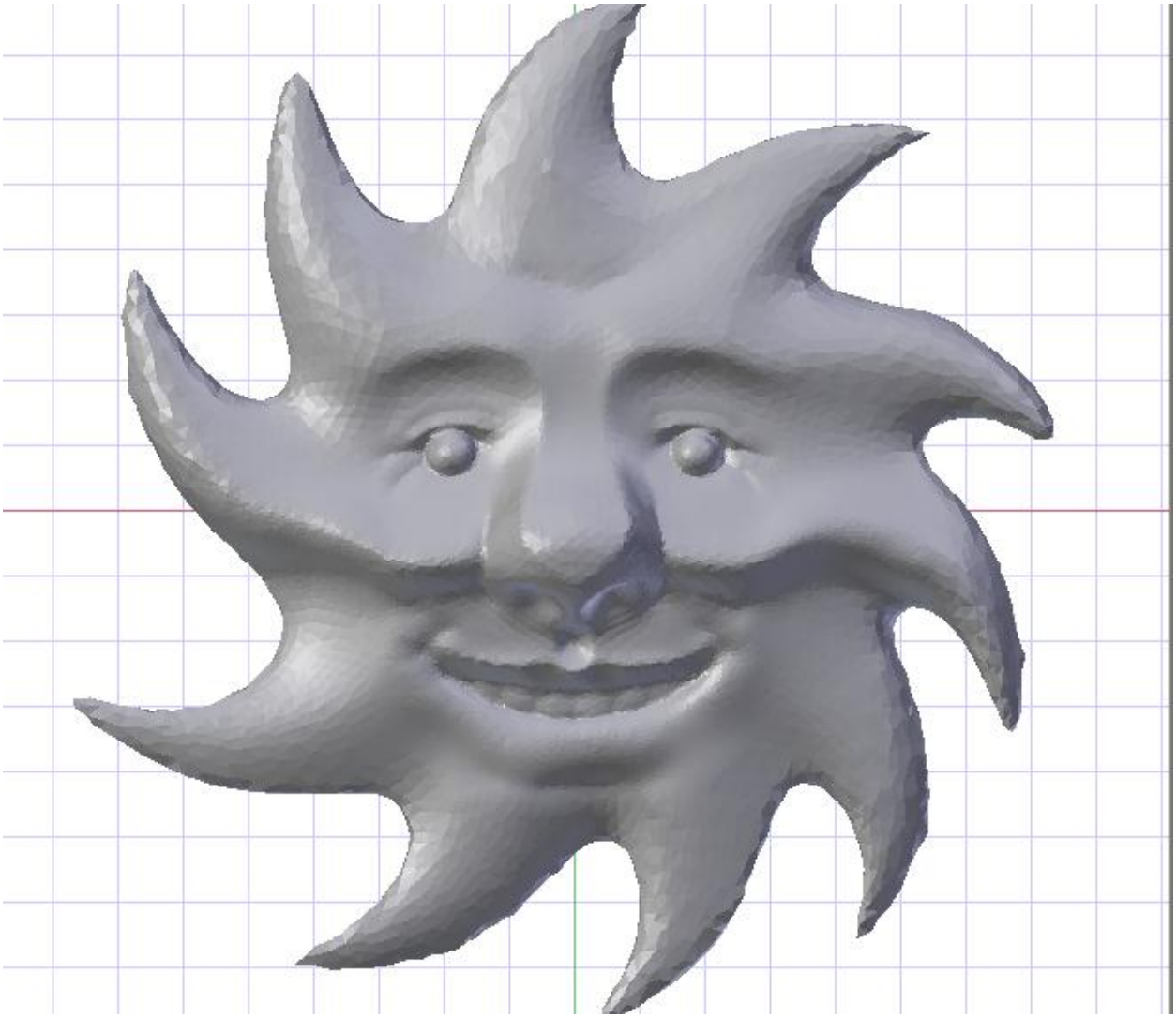


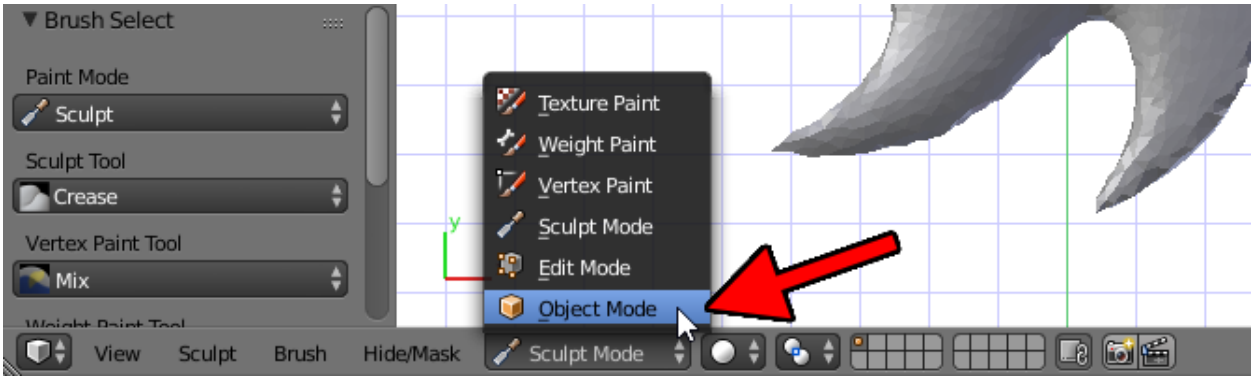


(1) Icosphere

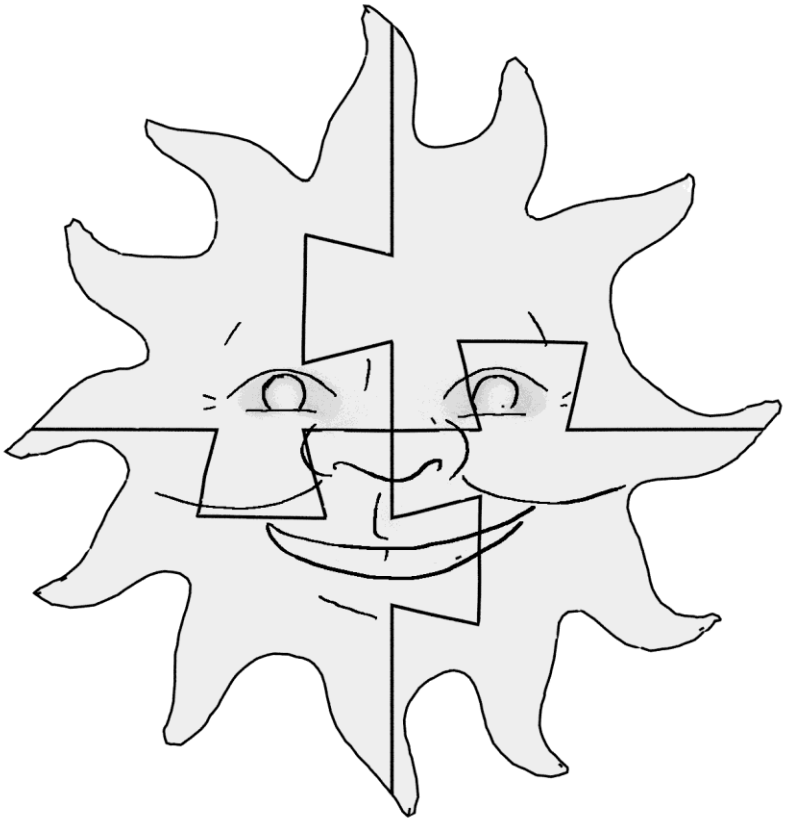

y
x

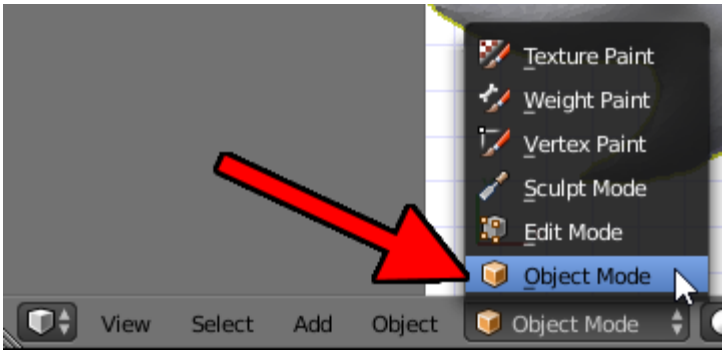


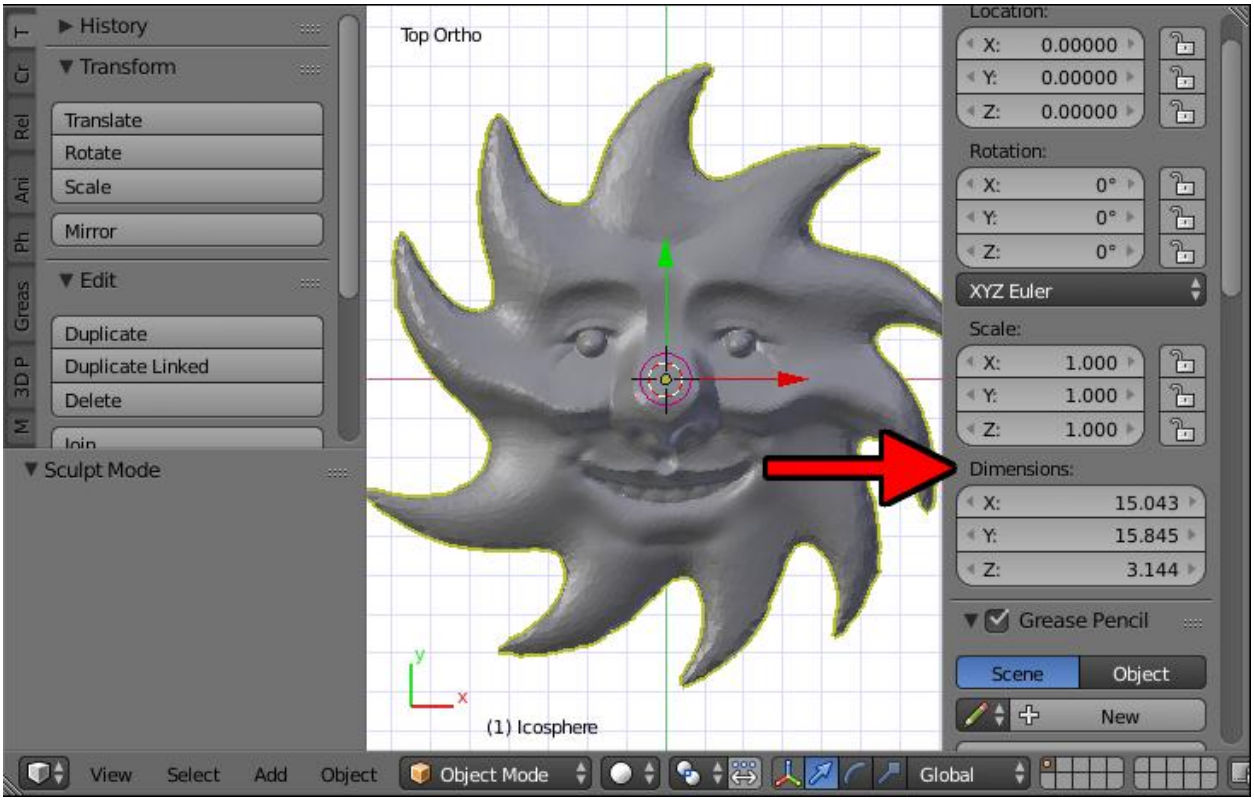


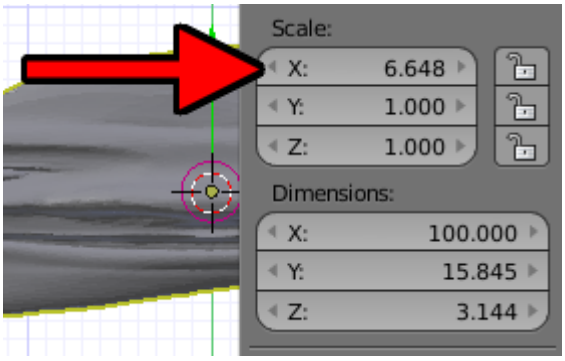

Brush Select
Paint Mode
Sculpt
Sculpt Tool
Crease
Vertex Paint Tool
Mix
Texture Paint
Weight Paint
Vertex Paint
Sculpt Mode
Edit Mode
Object Mode
View
Sculpt
Brush
Hide/Mask
Sculpt Mode

Chapter 7: Cutting a 3D Jigsaw Puzzle






History
Transform
Translate
Rotate
Scale
Mirror
Edit
Duplicate
Duplicate Linked
Delete
Sculpt Mode
Top Ortho
(1) Icosphere
Location:
X: 0.00000
Y: 0.00000
Z: 0.00000
Rotation:
X: 0°
Y: 0°
Z: 0°
XYZ Euler
Scale:
X: 1.000
Y: 1.000
Z: 1.000
Dimensions:
X: 15.043
Y: 15.845
Z: 3.144
Grease Pencil
Scene
Object
New
View
Select
Add
Object
Object Mode
Global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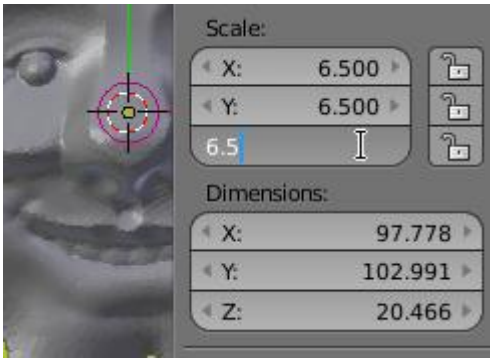
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6.5
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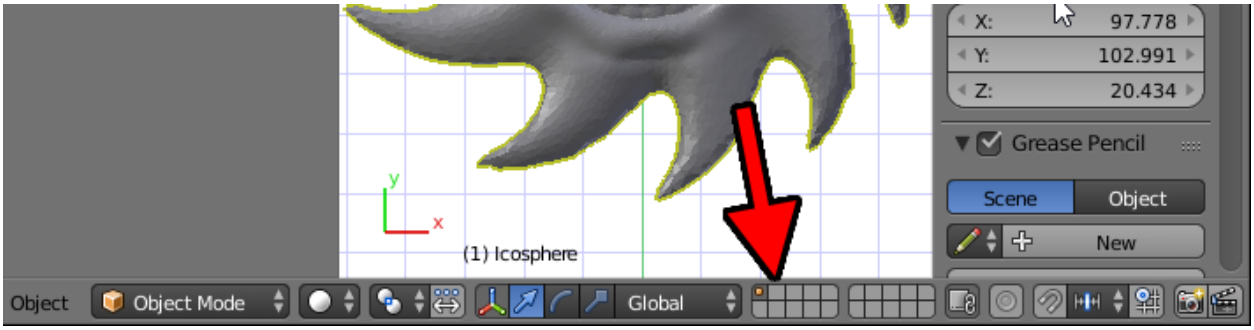
Y: 102.991
Z: 20.466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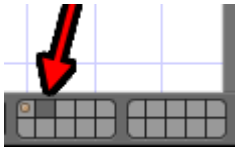
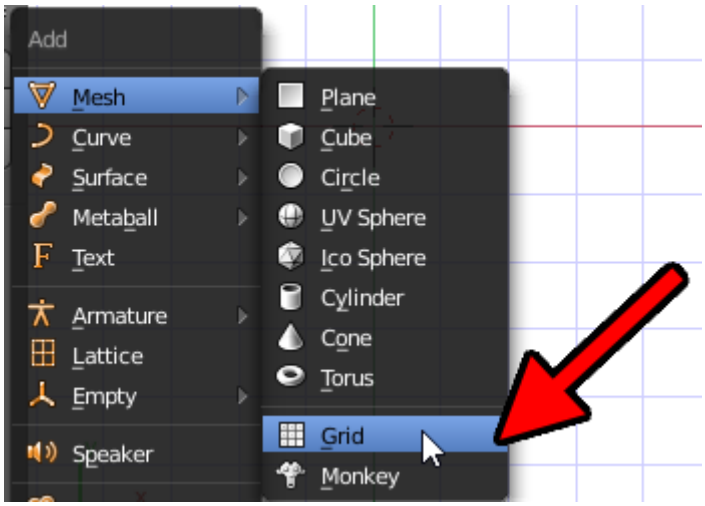
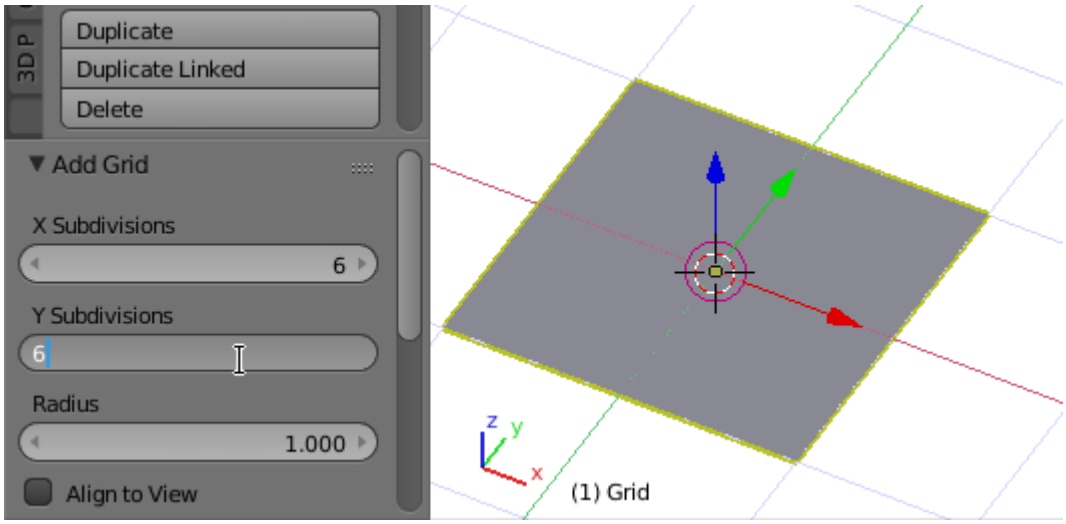
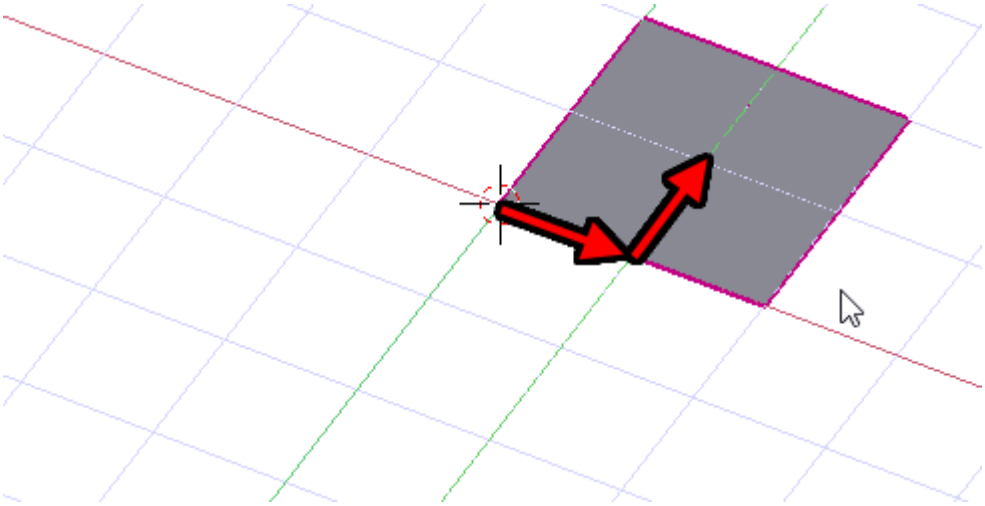
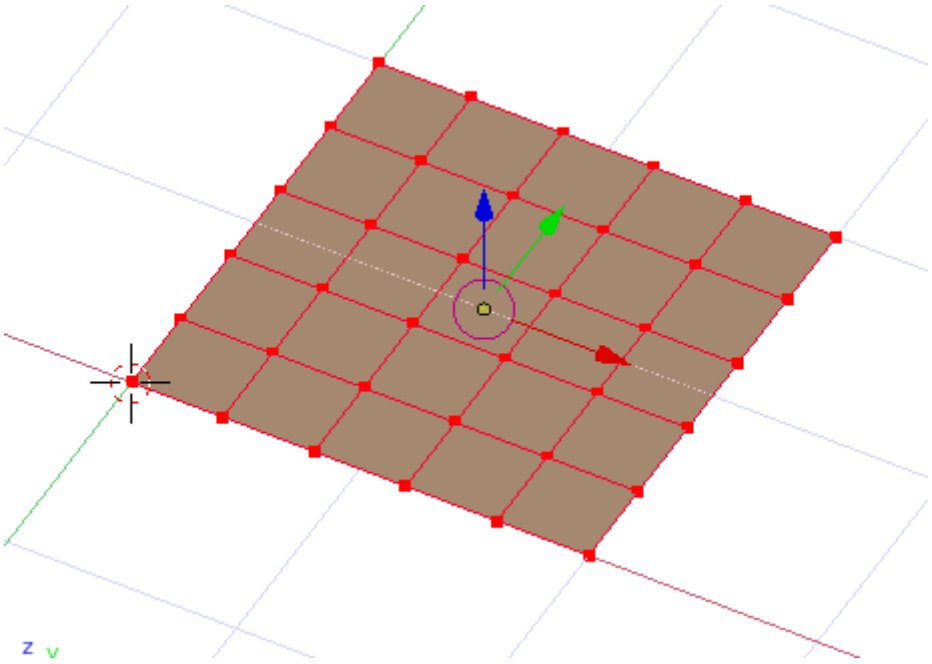
Y: 102.991
Z: 20.434
Grease Pencil
Scene
Object
New
(1) Icosphere
Object
Object Mode
Global

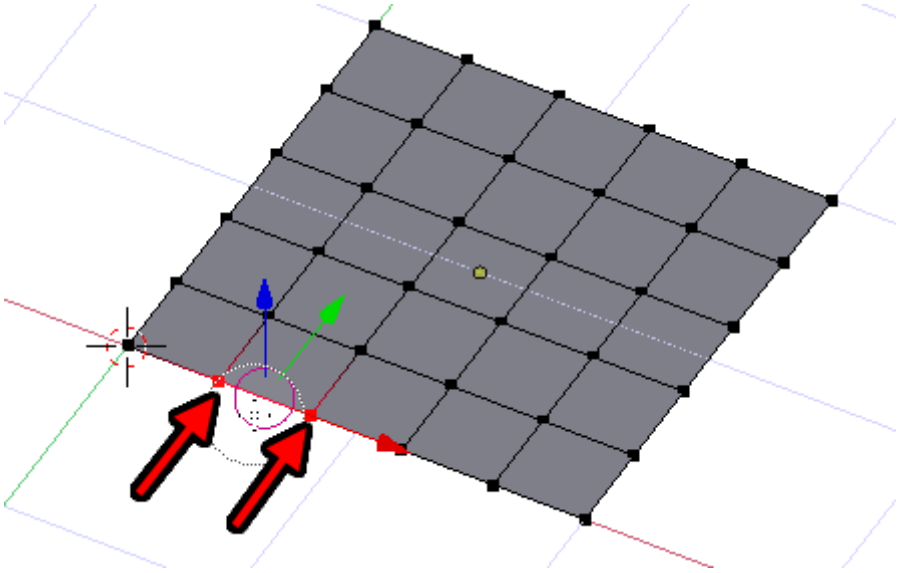


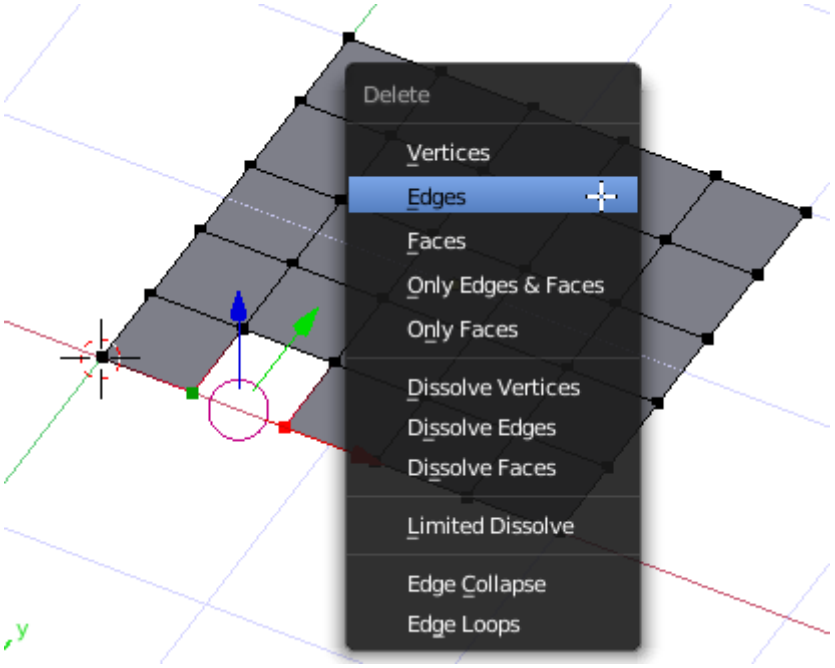

Add
Mesh
Curve
Surface
Metaball
Text
Armature
Lattice
Empty
Speaker
Plane
Cube
Circle
UV Sphere
Ico Sphere
Cylinder
Cone
Torus
Grid
Monkey

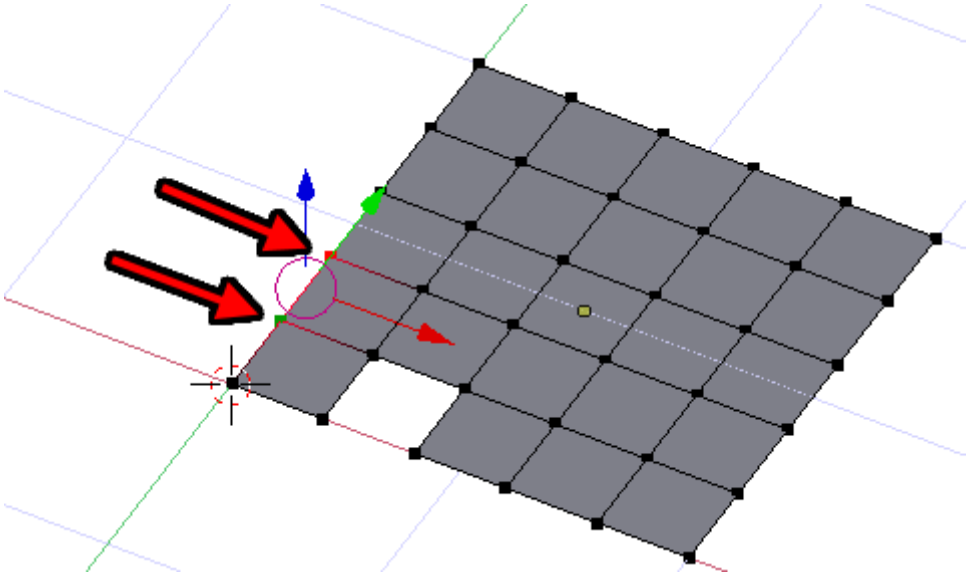

3D P
Duplicate
Duplicate Linked
Delete
Add Grid
X Subdivisions
6
Y Subdivisions
6
Radius
1.000
Align to View
(1) Grid

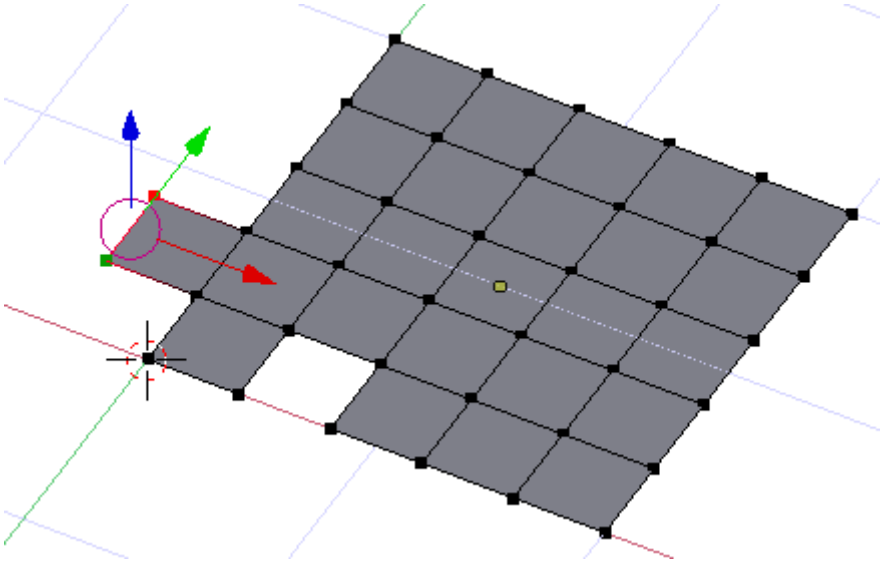


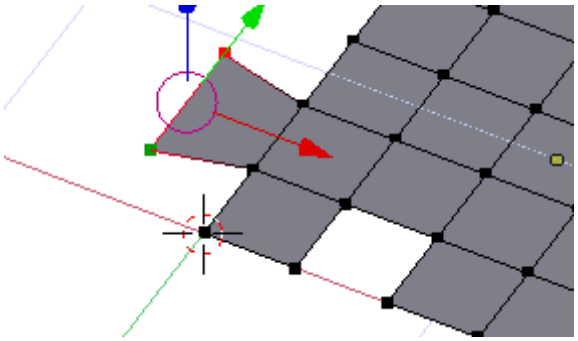

z
y

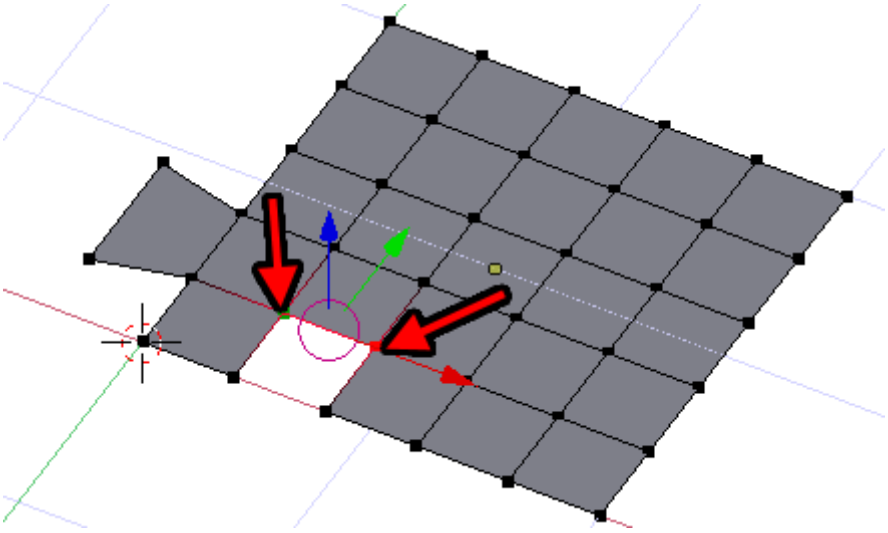


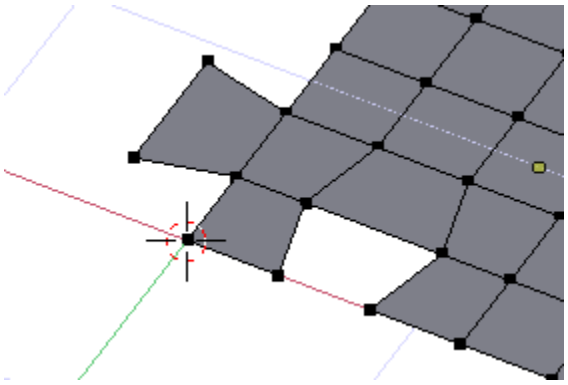

Delete
Vertices
Edges
Faces
Only Edges & Faces
Only Faces
Dissolve Vertices
Dissolve Edges
Dissolve Faces
Limited Dissolve
Edge Collapse
Edge Loops

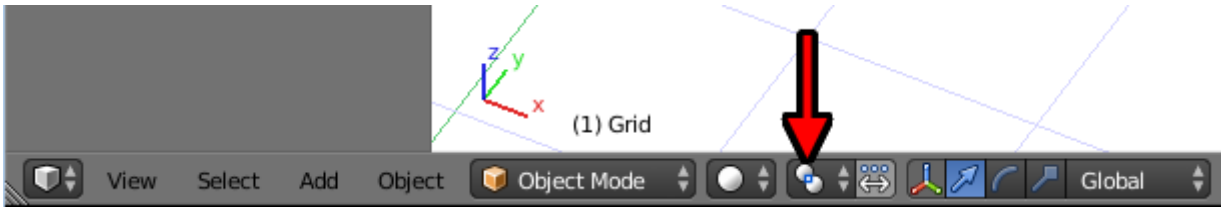


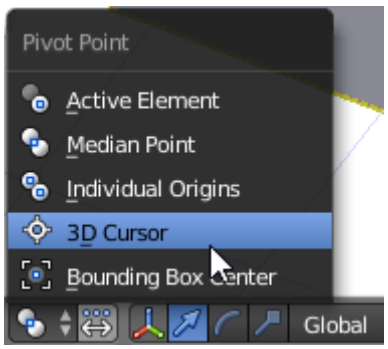









z
y
x
(1) Grid
View
Select
Add
Object
Object Mode
Global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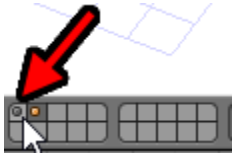
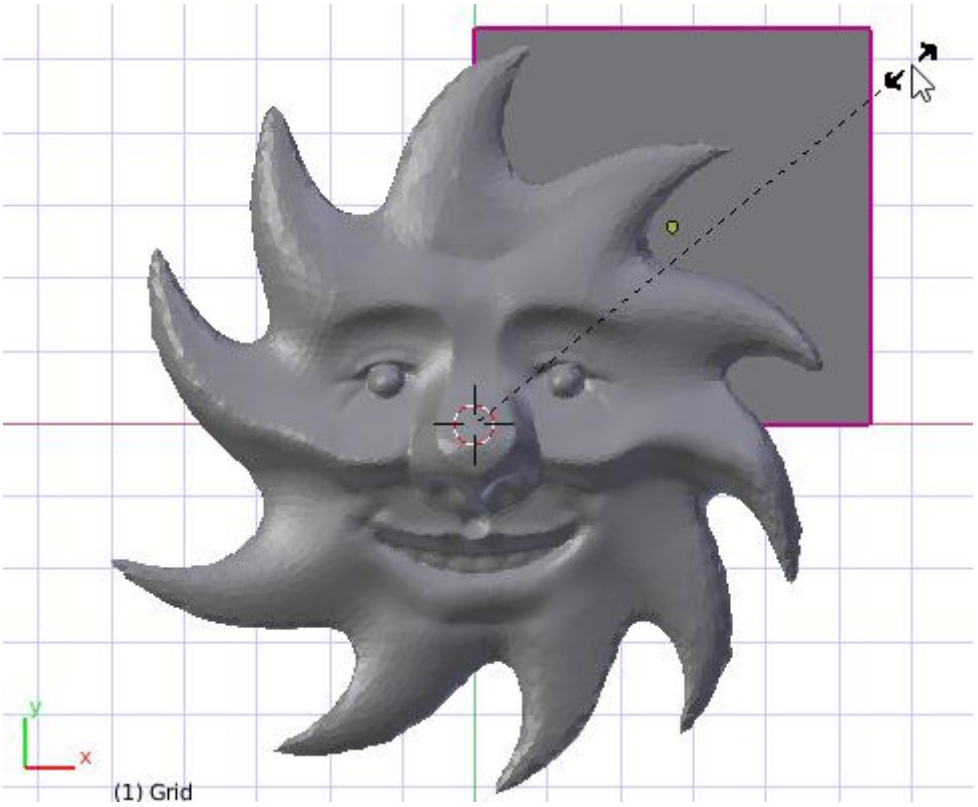
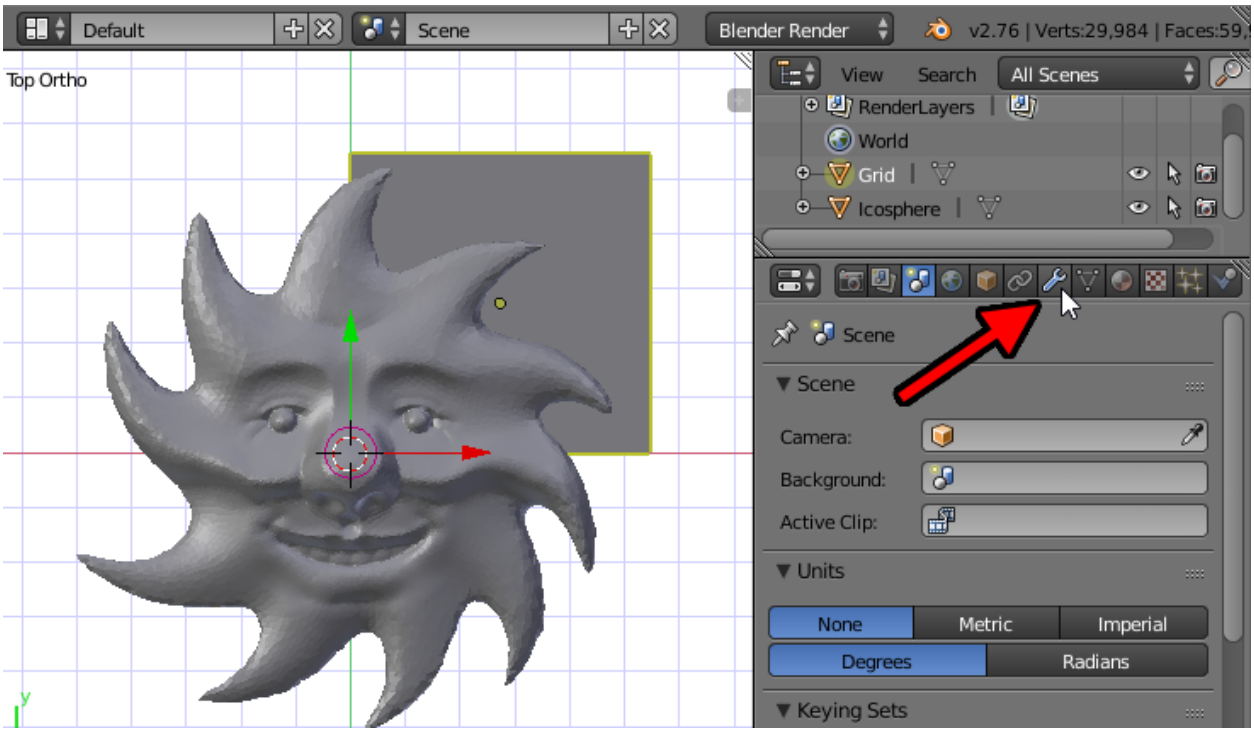
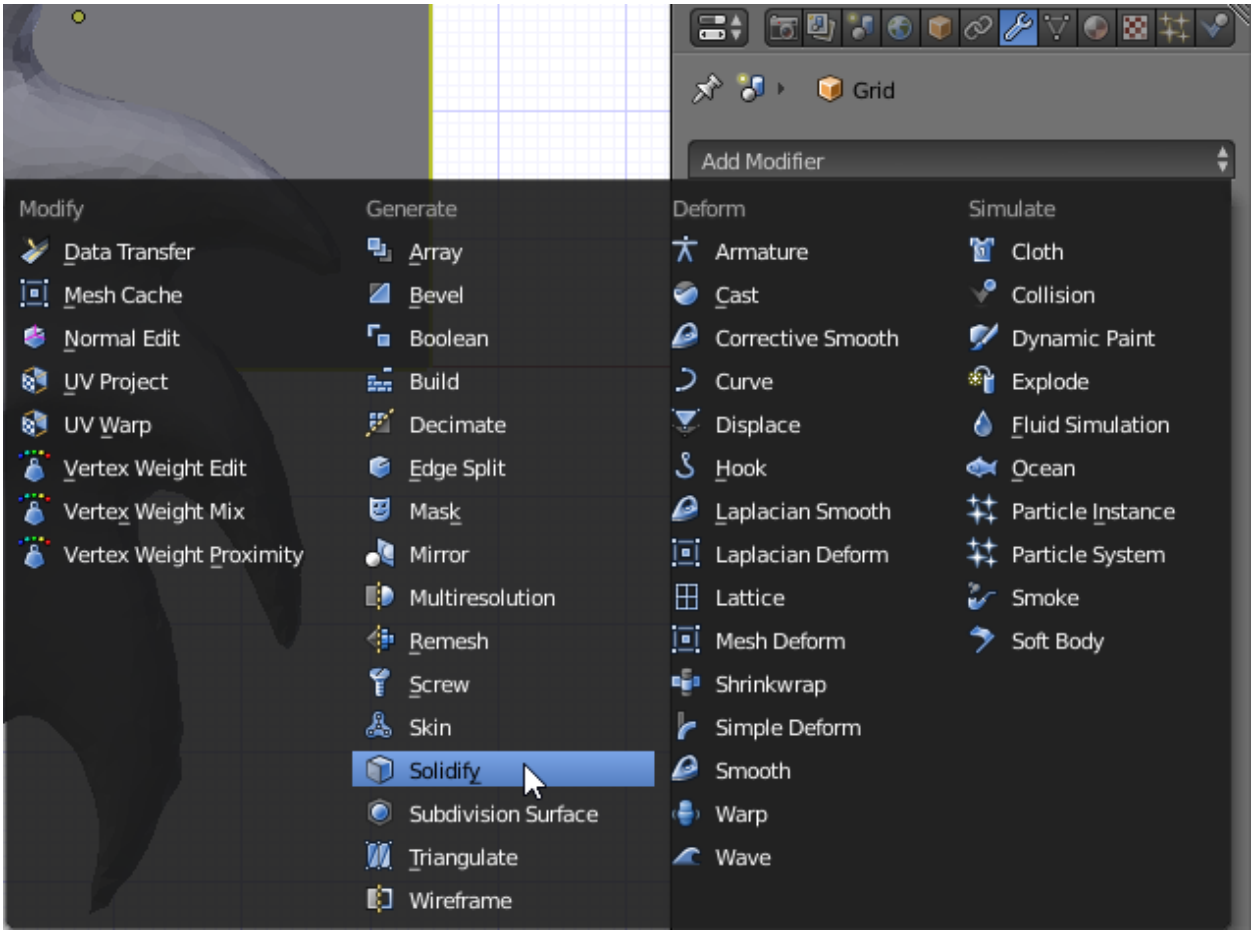
Active Element
Median Point
Individual Origins
3D Cursor
Bounding Box Center
Global




(1) Grid


Default
Scene
Blender Render
v2.76 | Verts:29,984 | Faces:59,
Top Ortho
View
Search
All Scenes
RenderLayers
World
Grid
Icosphere
Scene
Scene
Camera:
Background:
Active Clip:
Units
None
Metric
Imperial
Degrees
Radians
Keying Sets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Add Modifier
Modify
Data Transfer
Mesh Cache
Normal Edit
UV Project
UV Warp
Vertex Weight Edit
Vertex Weight Mix
Vertex Weight Proximity
Generate
Array
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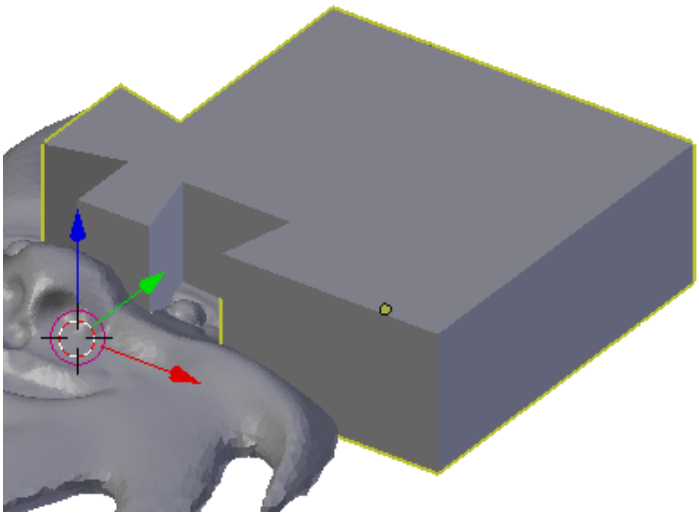
Boolean
Build
Decimate
Edge Split
Mask
Mirror
Multiresolution
Remesh
Screw
Skin
Solidify
Subdivision Surface
Triangulate
Wireframe
Deform
Armature
Cast
Corrective Smooth
Curve
Displace
Hook
Laplacian Smooth
Laplacian Deform
Lattice
Mesh Deform
Shrinkwrap
Simple Deform
Smooth
Warp
Wave
Simulate
Cloth
Collision
Dynamic Paint
Explode
Fluid Simulation
Ocean
Particle Instance
Particle System
Smoke
Soft Body



Add Modifier
Solidi
Apply
Copy
Thickness: 20.0000
Offset: 1.0000
Clamp: 0.0000
Flip Normals
Even Thickness
High Quality Norm...
Factor: 0.000
Fill Rim
Crease:
Only Rim
Inner: 0.000
Outer: 0.000
Material Index Offset:
Rim: 0.000
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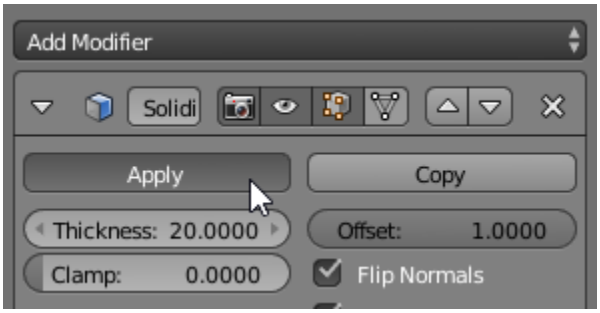
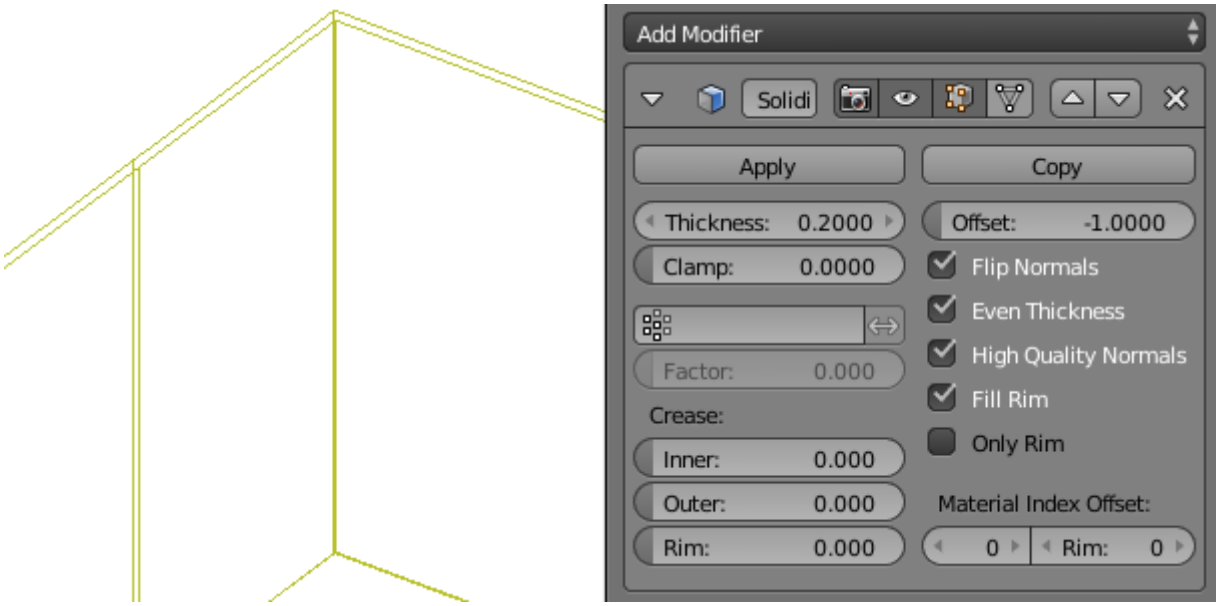
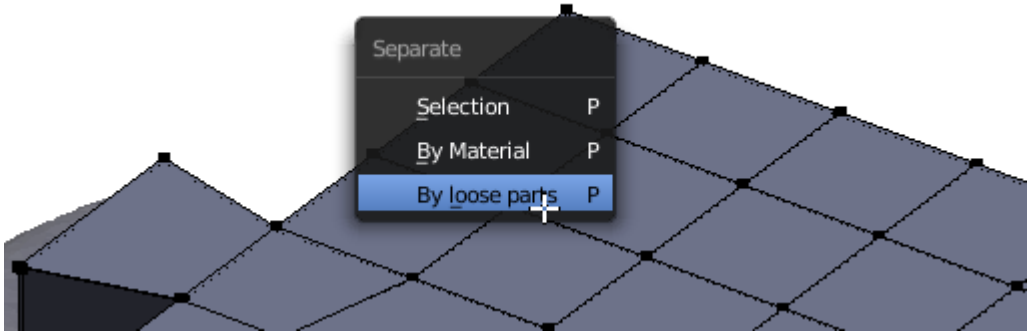
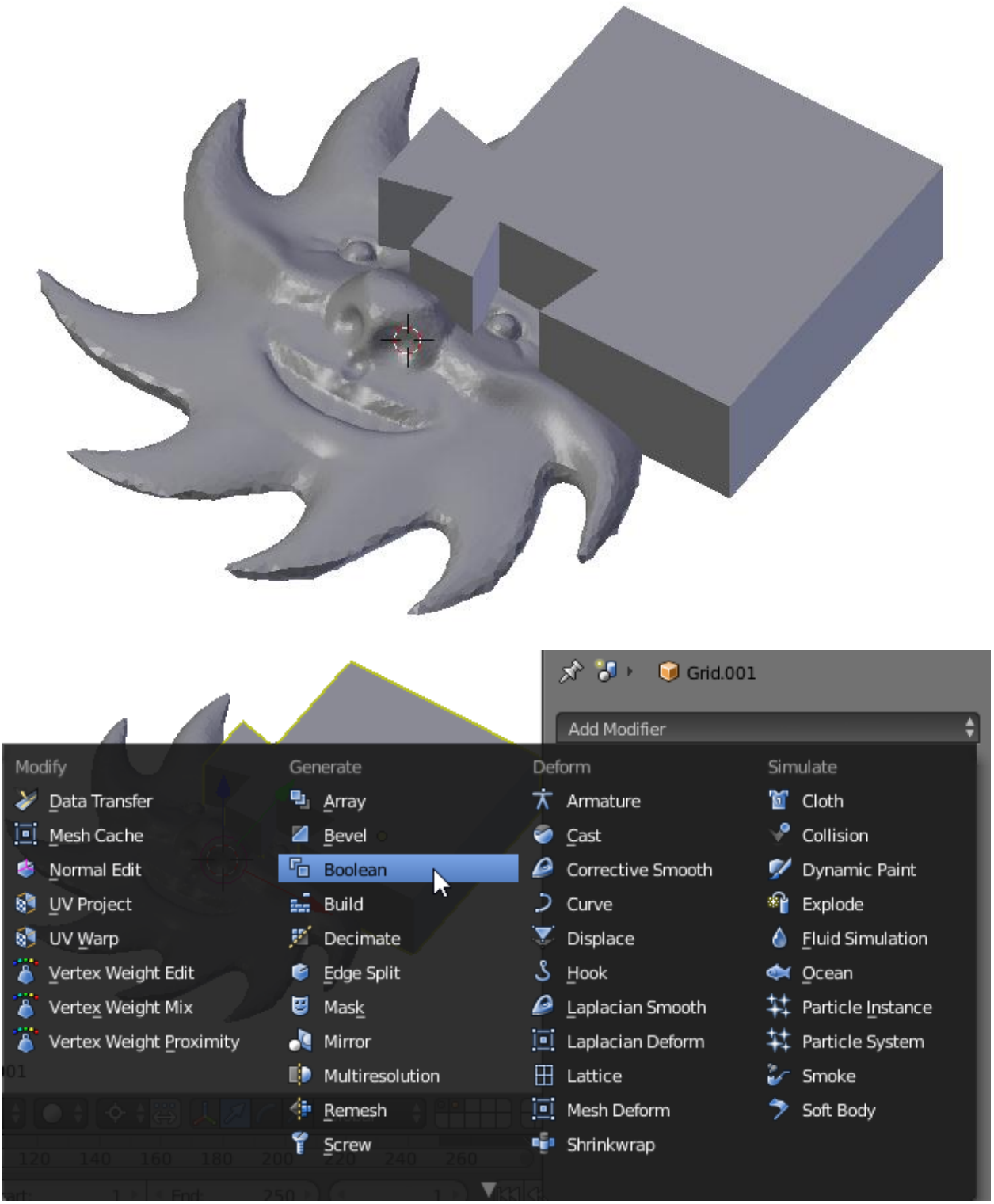
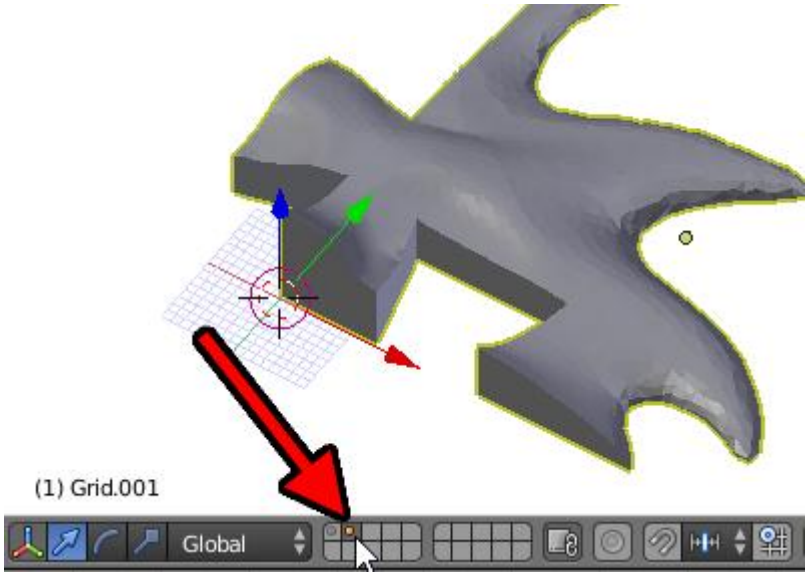
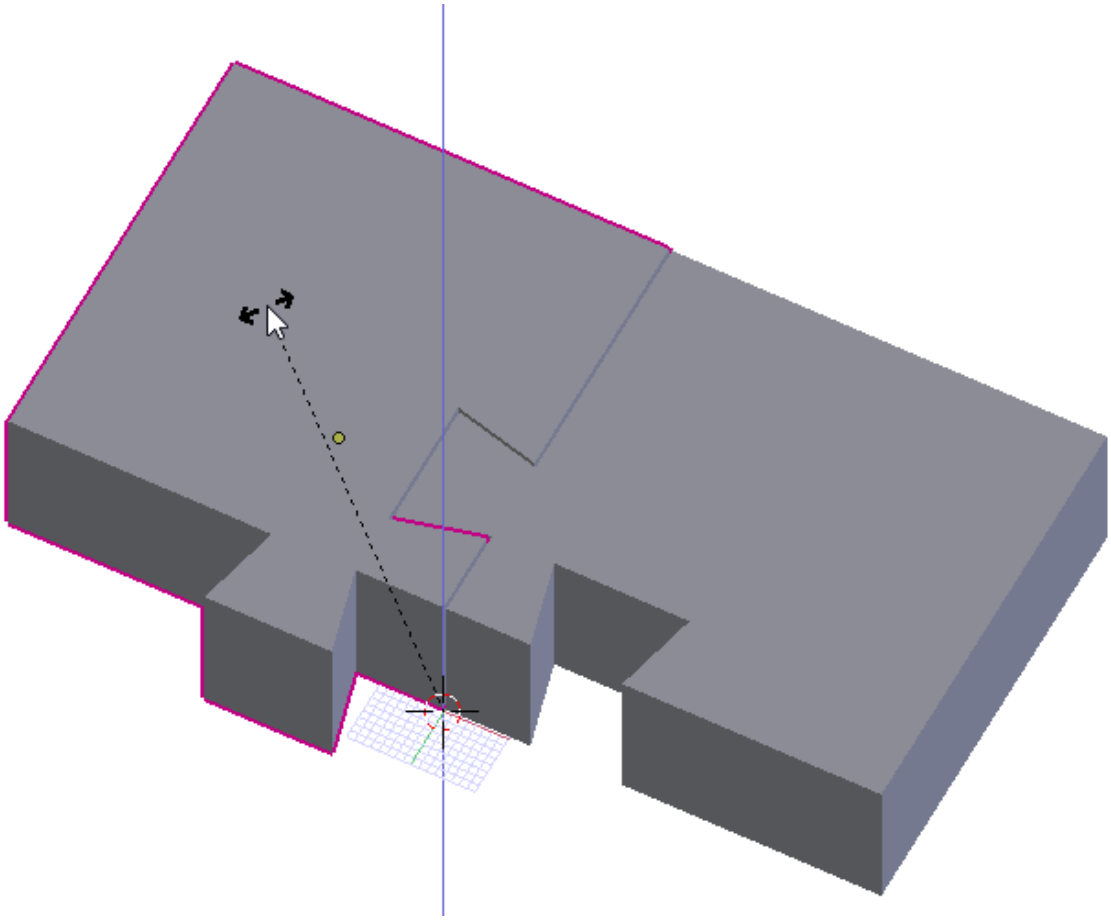
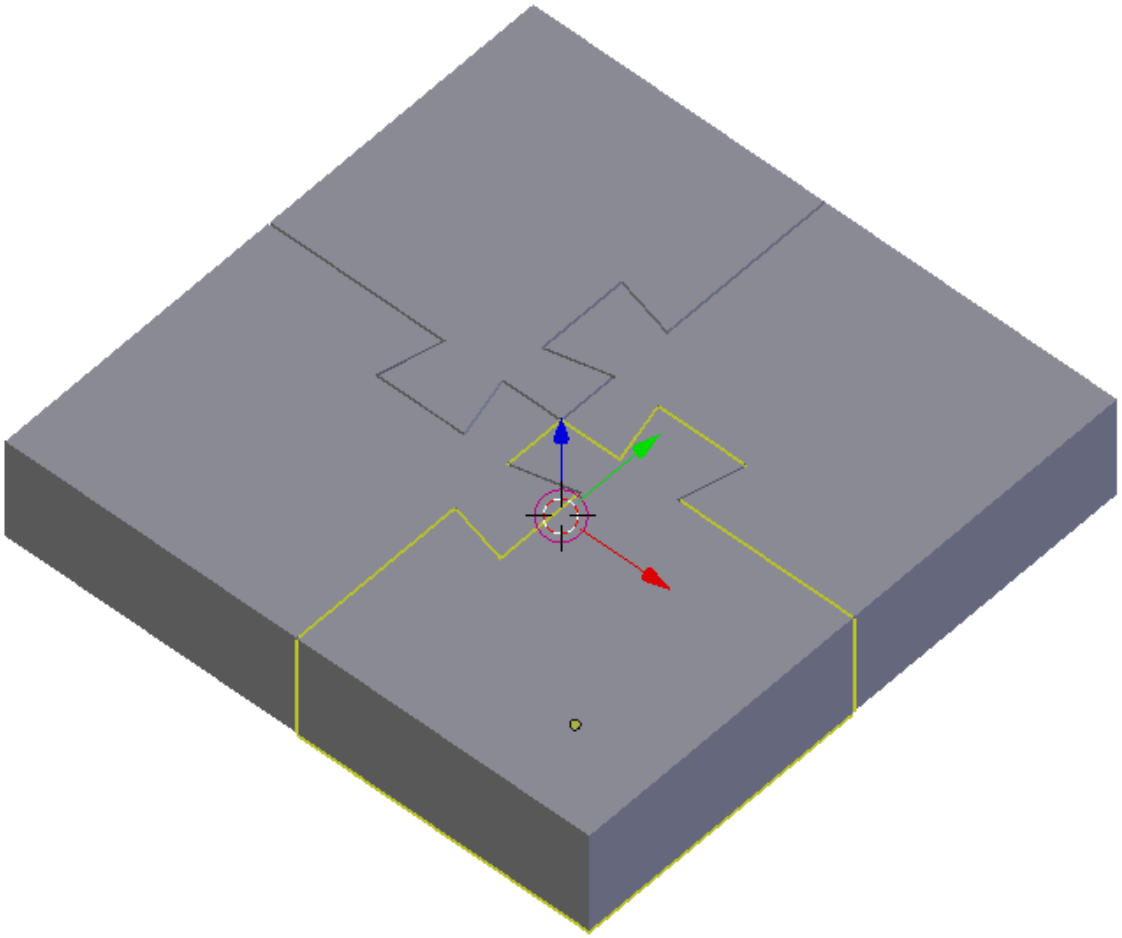
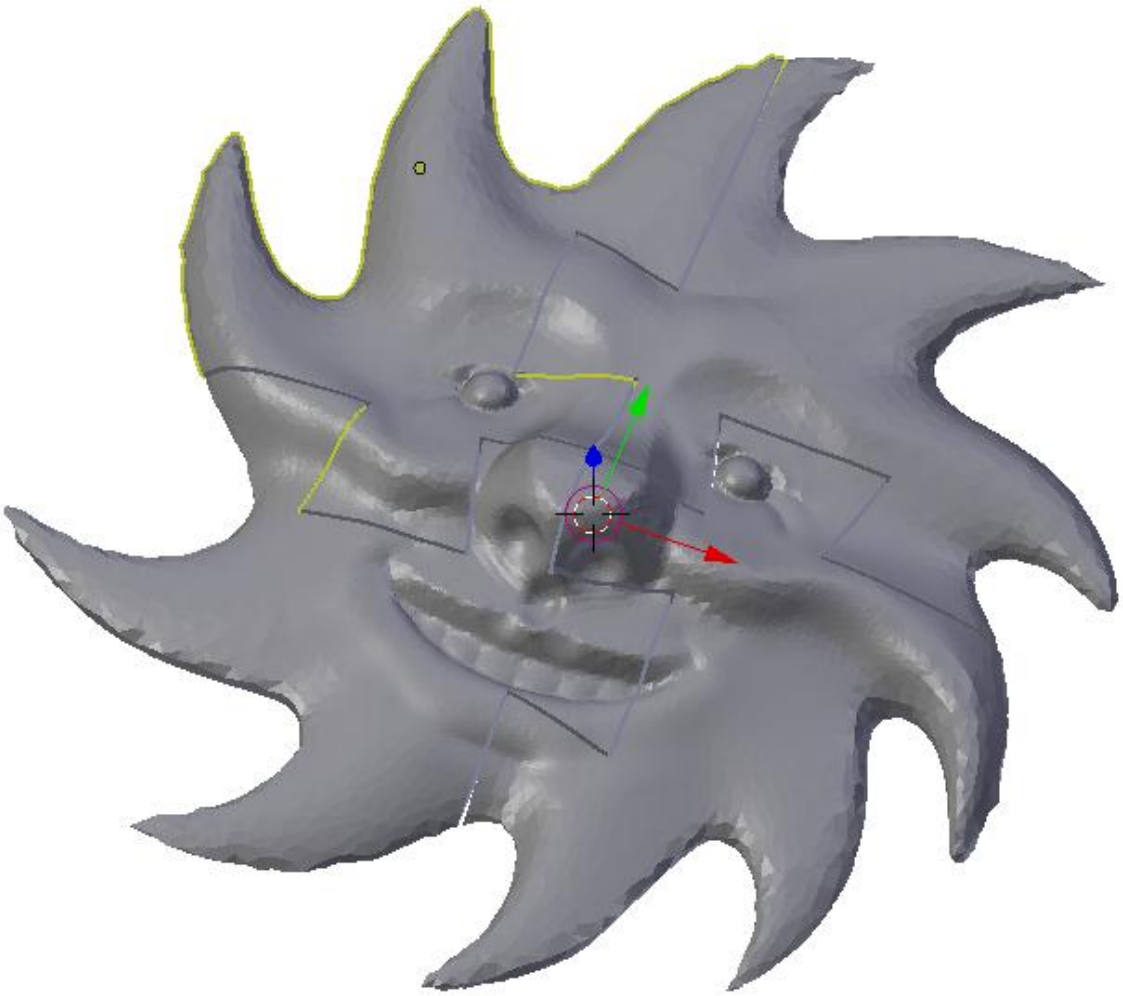
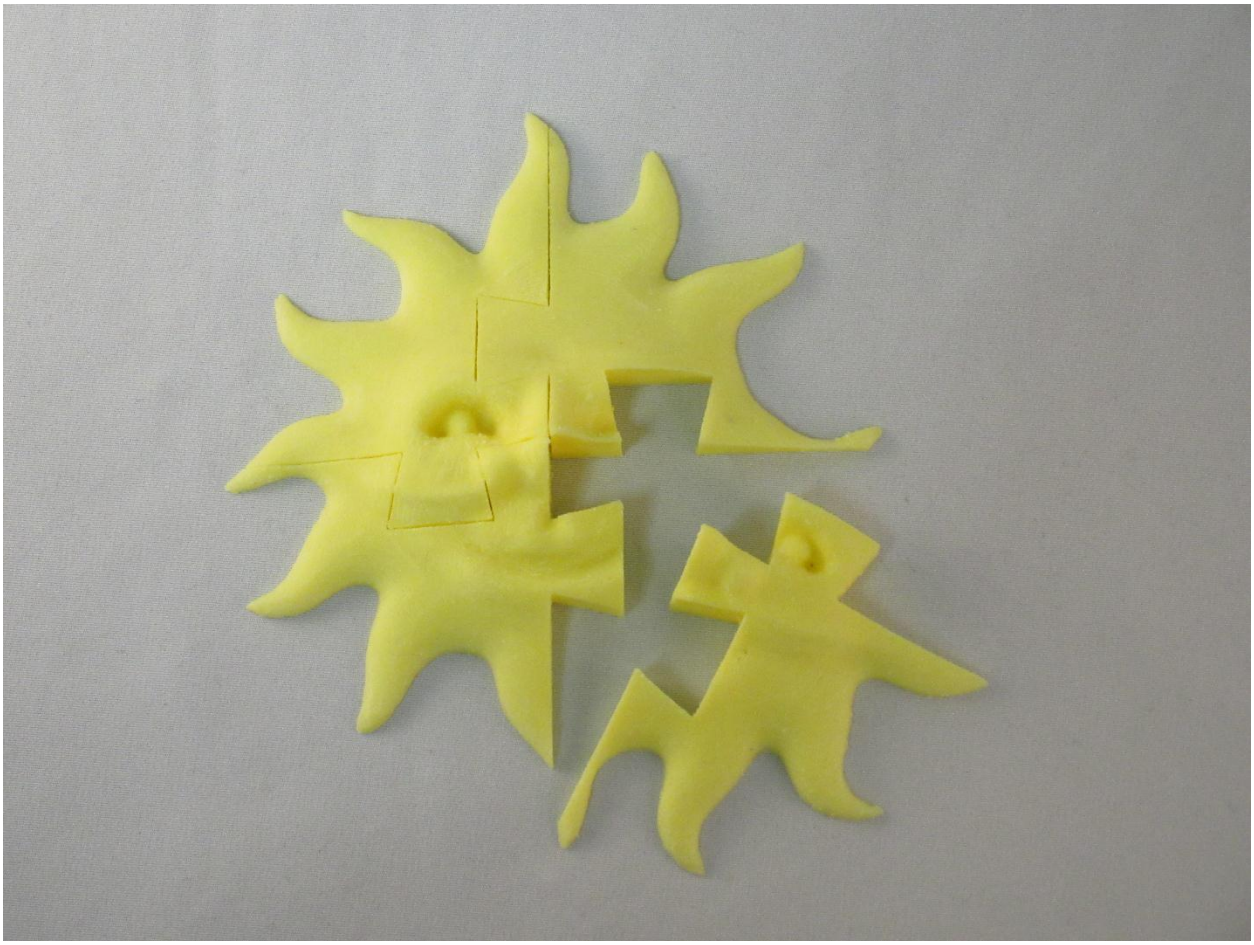
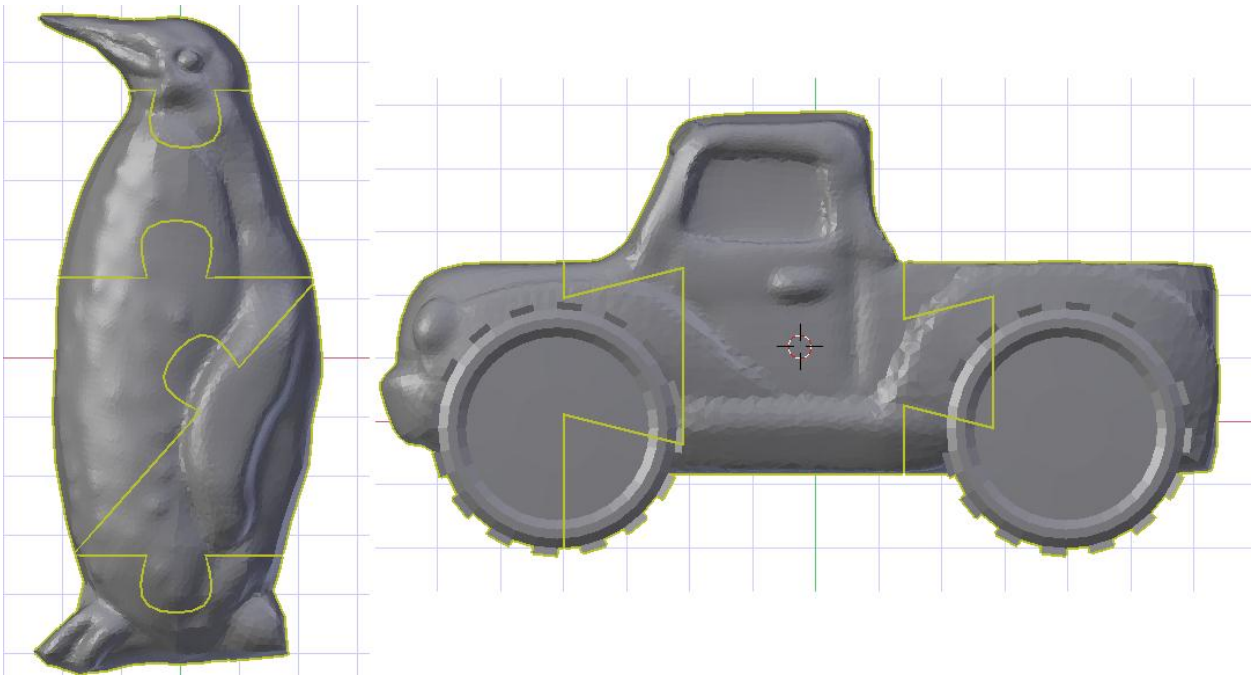

Add Modifier
Solidi
Apply
Copy
Thickness: 20.0000
Offset: 1.0000
Clamp: 0.0000
Flip Normals


Add Modifier
Solidi
Apply
Copy
Thickness: 0.2000
Offset: -1.0000
Clamp: 0.0000
Flip Normals
Even Thickness
High Quality Normals
Factor: 0.000
Fill Rim
Crease:
Only Rim
Inner: 0.000
Outer: 0.000
Material Index Offset:
Rim: 0.000
0
Rim: 0


Separate
Selection P
By Material P
By loose parts P


Grid.001
Add Modifier
Modify
Data Transfer
Mesh Cache
Normal Edit
UV Project
UV Warp
Vertex Weight Edit
Vertex Weight Mix
Vertex Weight Proximity
Generate
Array
Bevel
Boolean
Build
Decimate
Edge Split
Mask
Mirror
Multiresolution
Remesh
Screw
Deform
Armature
Cast
Corrective Smooth
Curve
Displace
Hook
Laplacian Smooth
Laplacian Deform
Lattice
Mesh Deform
Shrinkwrap
Simulate
Cloth
Collision
Dynamic Paint
Explode
Fluid Simulation
Ocean
Particle Instance
Particle System
Smoke
Soft Body

Boolean
Apply
Copy
Operation:
Object:
Intersect
Icosphere


(1) Grid.001
Global

Boolean
Apply
Copy
Operation:
Object:
Intersect
Icosphere