



BLENDER

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“You don’t have to be a model for modeling.”

- Pecko



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“You don’t have to be a model for modeling in Blender.”

- Pecko



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modeling software

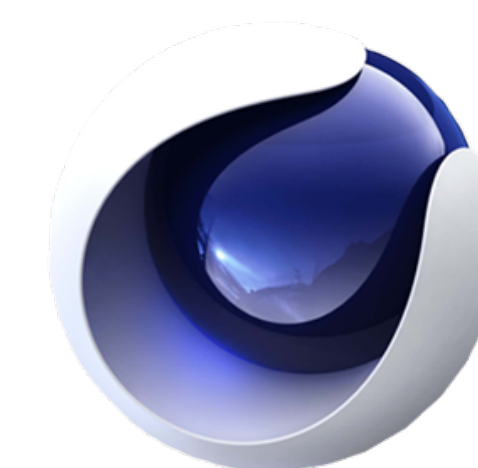


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Modeling software

- 3Ds Max (3D Studio)
- Maya
- Zbrush
- Cinema 4D
- SketchUp
- Blender 😊



CINEMA 4D

Incredible!

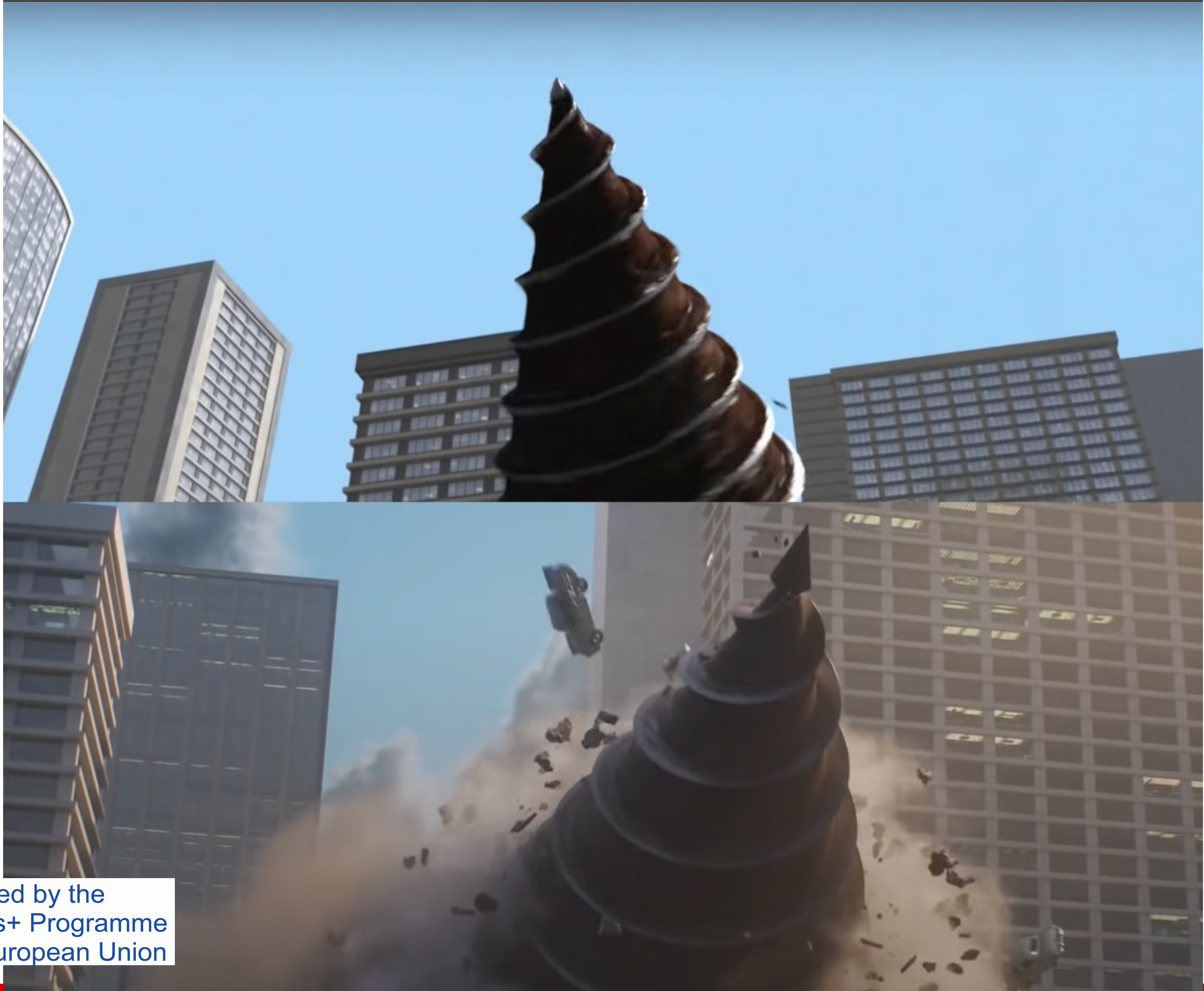
Incredibles

- 2004
- 1500 cores

Incredibles 2

- 2018
- 80000 cores
- 34000 CPU years
- 12,72 T pixels
- 7 Y rays (Quadrillion - 10^{15})





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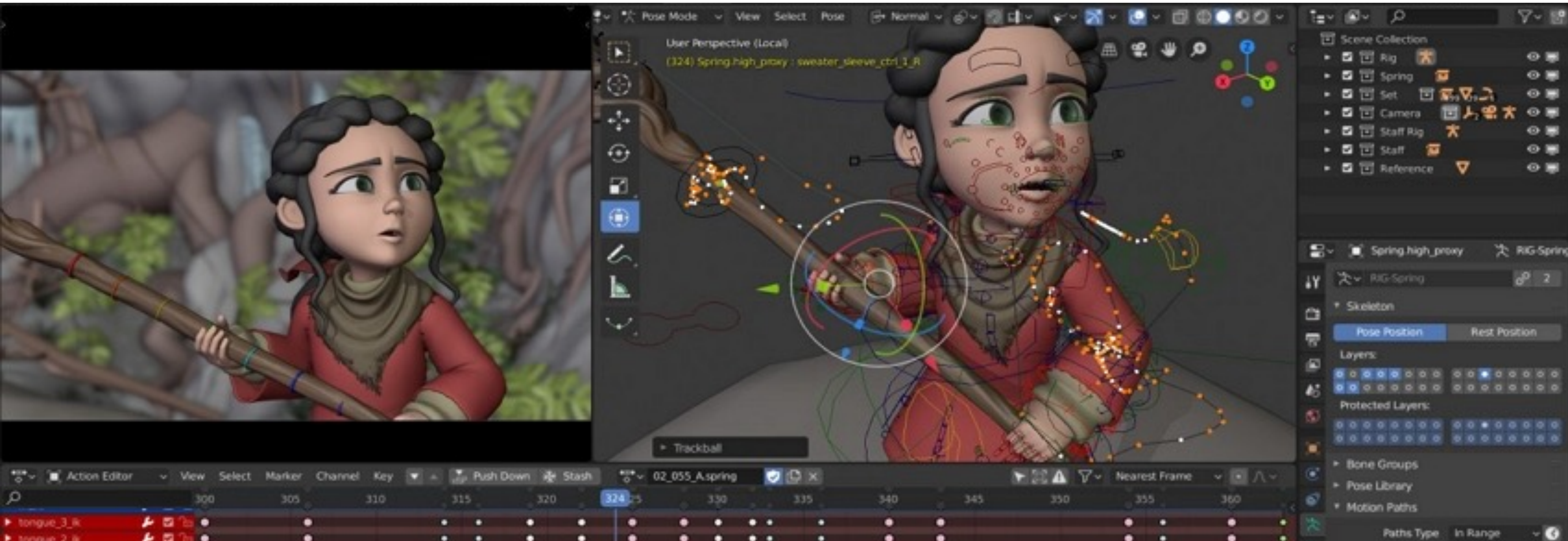
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introduction to Blender



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Blender 2.93 LTS is here!

An incredible closure to a series 20 years in the making.

blender.org/download/

Open source 3D creation. Free to use for any purpose, forever.

[Download Blender 2.93.0](#)

About

Blender is the free and open source 3D creation suite. It supports the entirety of the 3D pipeline—modeling, rigging, animation, simulation, rendering, compositing and motion tracking, video editing and 2D animation

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[Erasmus Institute](#)

Get Involved

Be part of the hundreds of contributors from around the world that make Blender; studios and individual artists, professionals and hobbyists, scientists and students, VFX experts and animators, and so on.

[Development](#) [Documentation](#) [Education](#) [Donations & Sponsors](#)



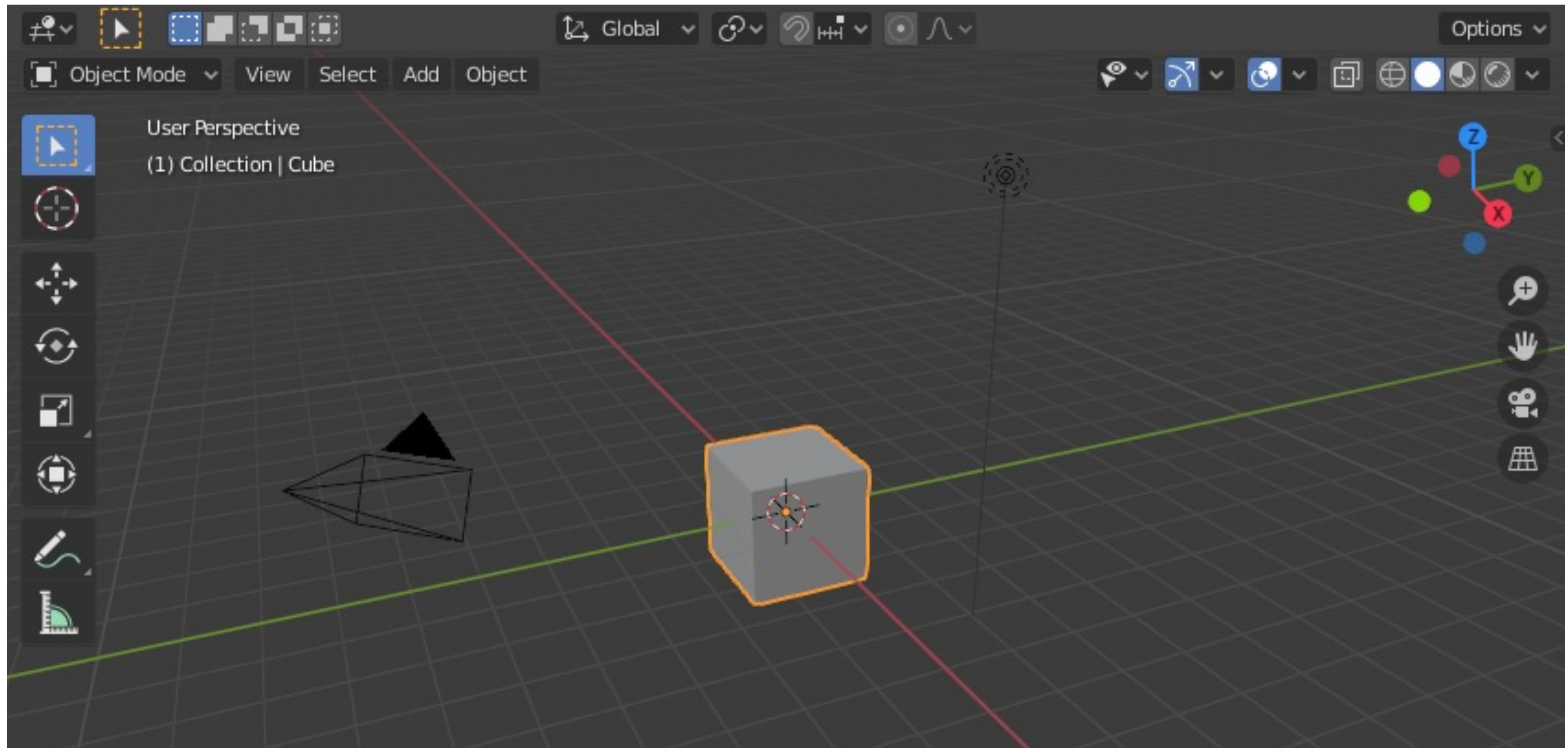


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LMME

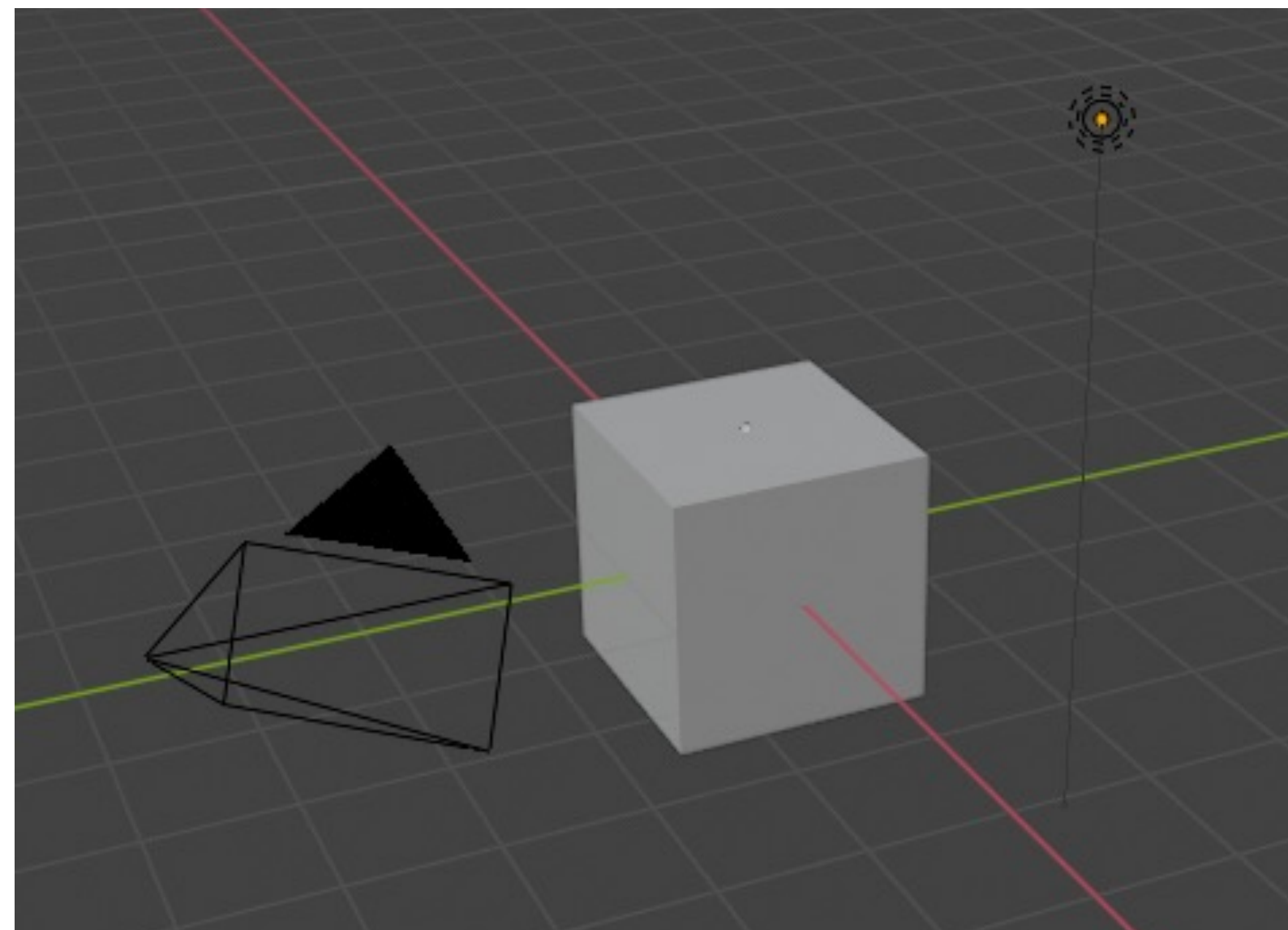
Workspace





Workspace

- cube
- camera
- light

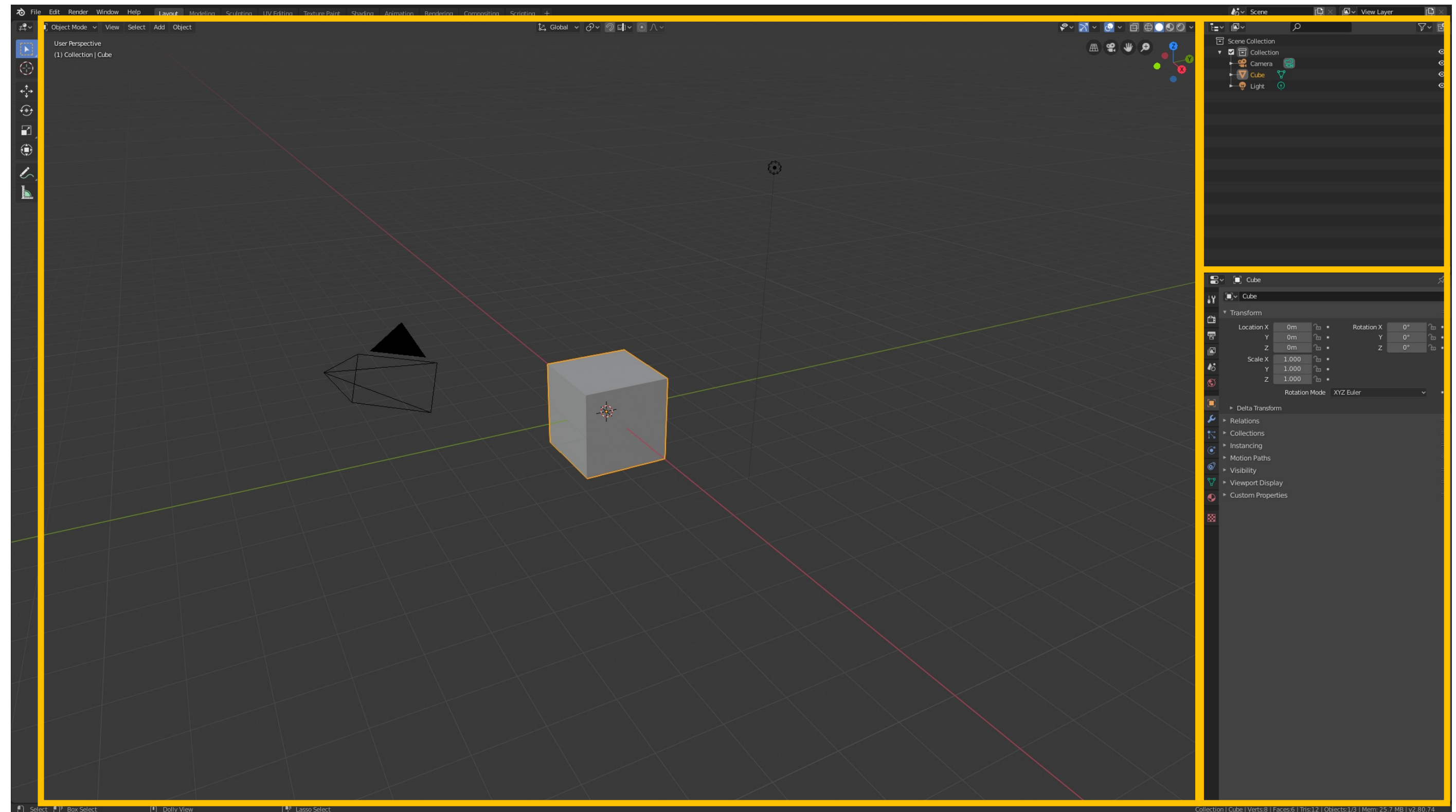


- orientation
- coordination system
 - X – red
 - Y – green
 - Z – blue



Editor type windows

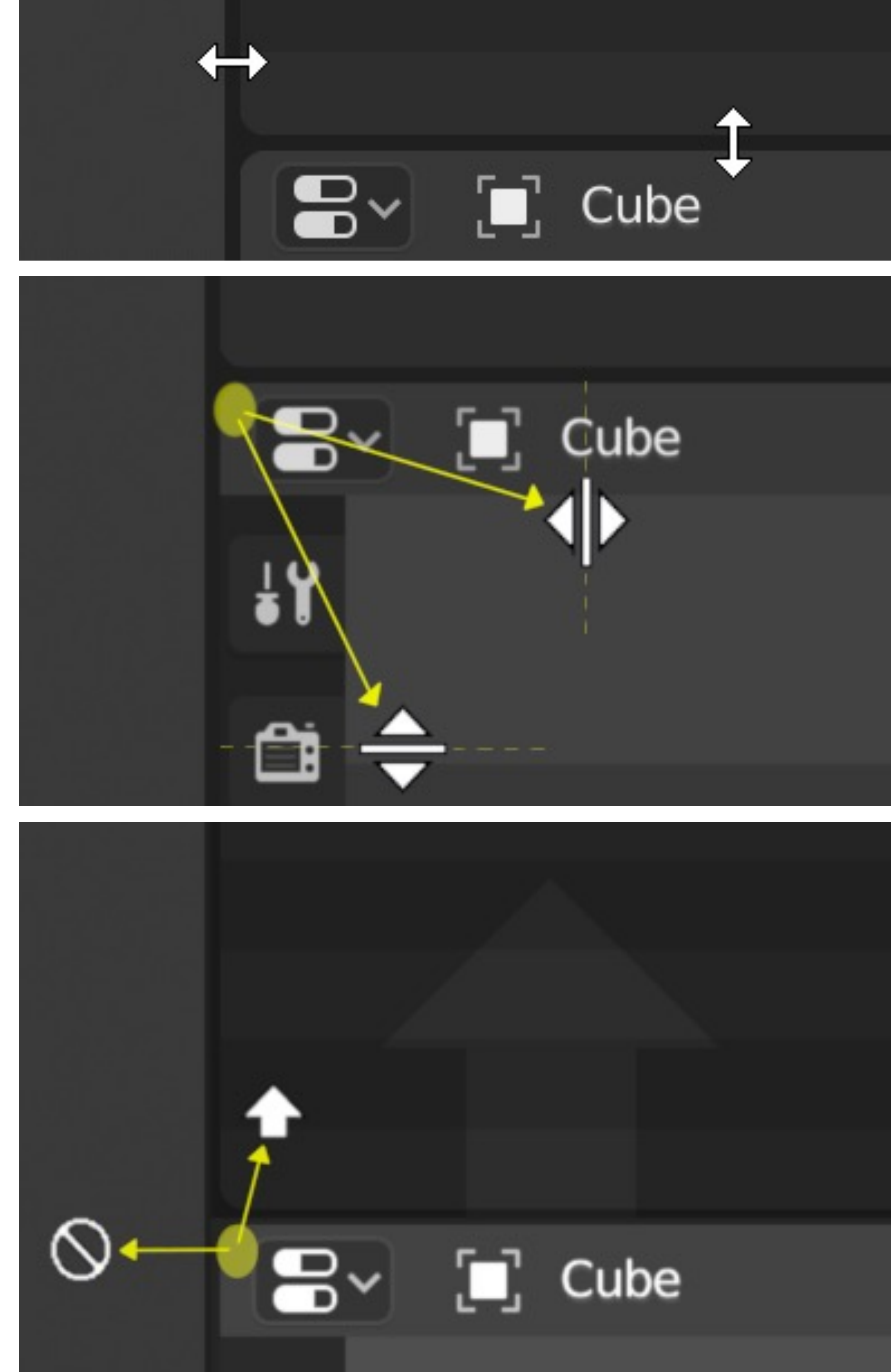
- fully adjustable
- most important
 - 3D view
 - outliner
 - properties



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Setting up the view

- creating customizable layouts with any number of areas
- resizing areas
- splitting area in two
- joining two areas back together





Properties

- workspace
- render
- output
- view layer
- scene
- world
- object
- modifiers
- particles
- physics
- object constraints
- object data
- materials
- textures





T-menu

- options depend on the current mode
- show / hide with shortcut **T**

- select box

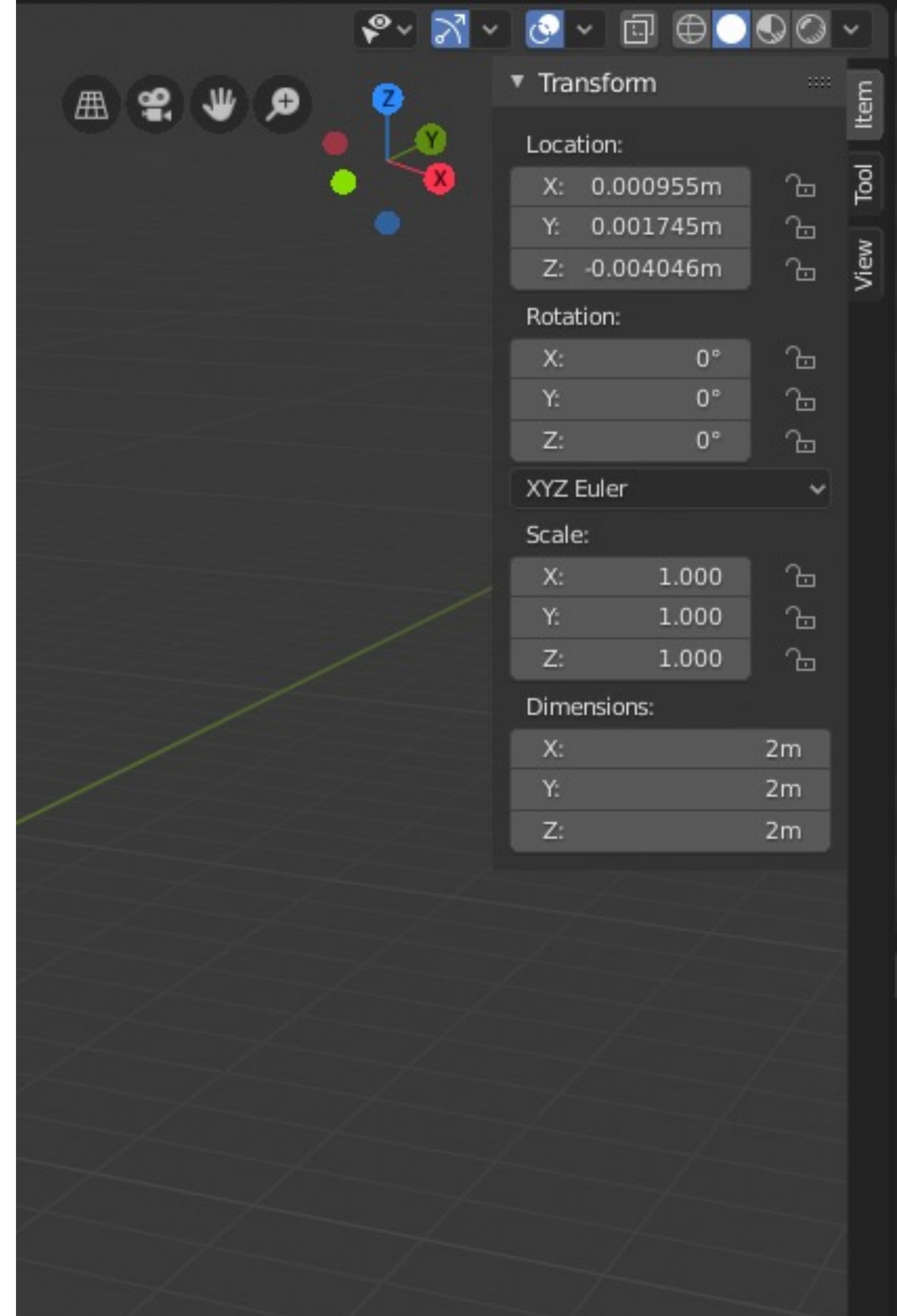
- cursor

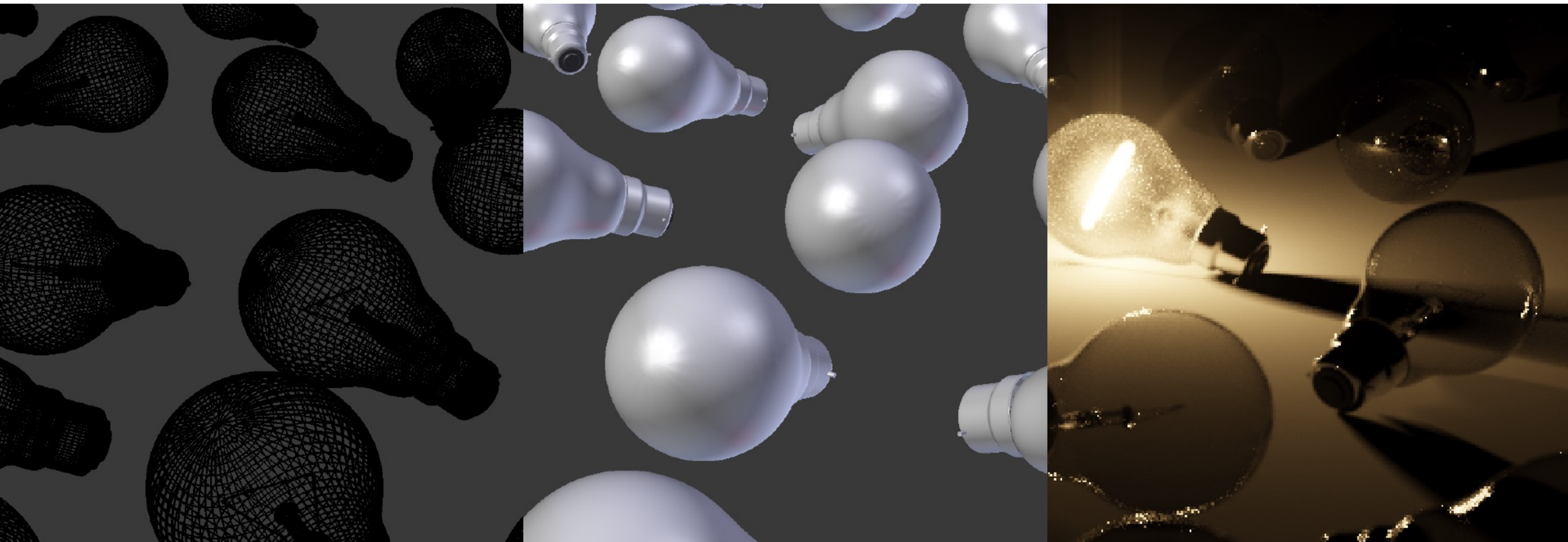
- move, rotate, scale, transform

- annotate and measure

N-menu

- options depend on the current mode
- show / hide with shortcut **N**
- item
- tool
- view





3D viewport

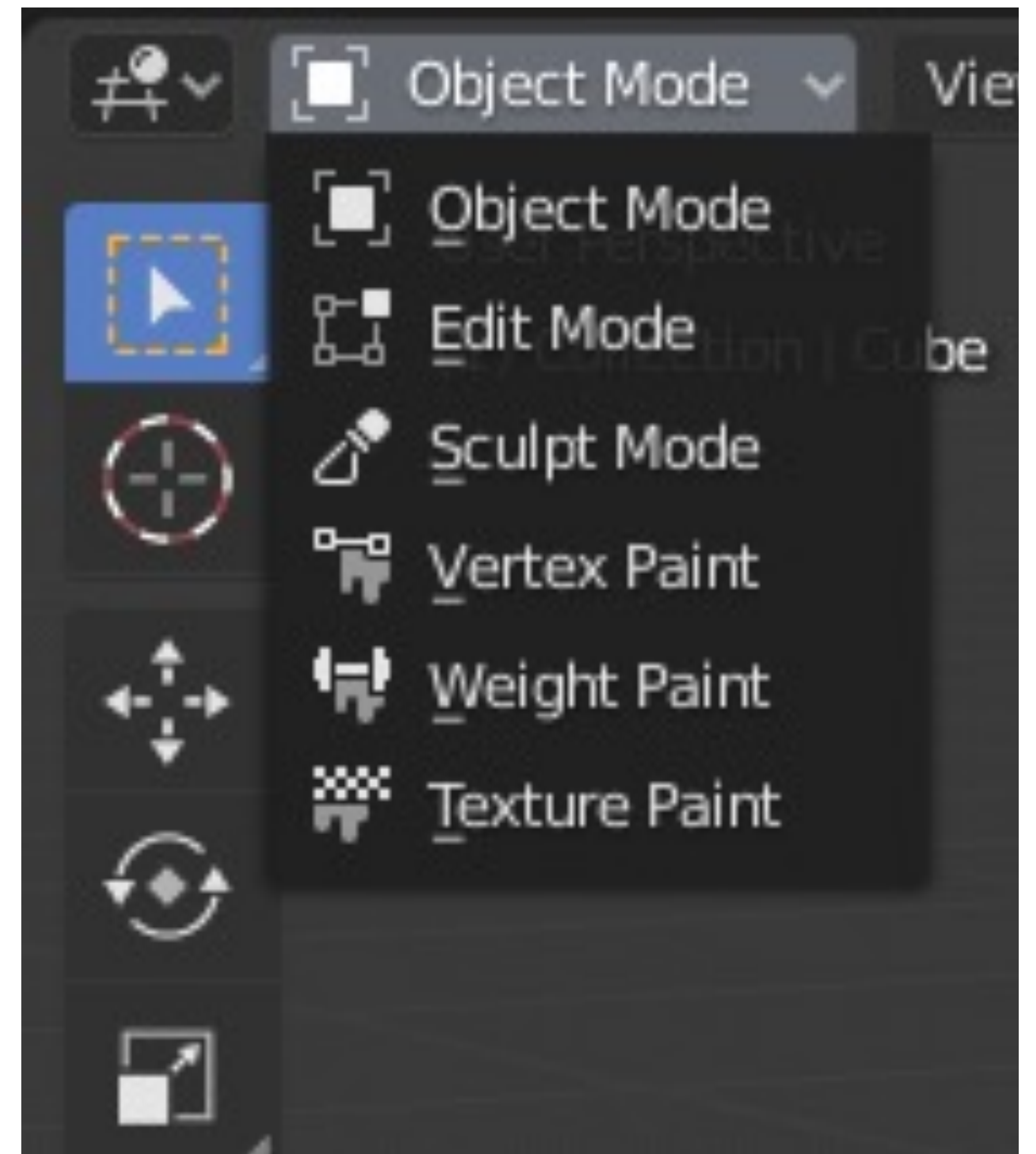


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Modes

- different modes
- designed to edit an aspect of the object
- vary depending on the type of selected object



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Object mode

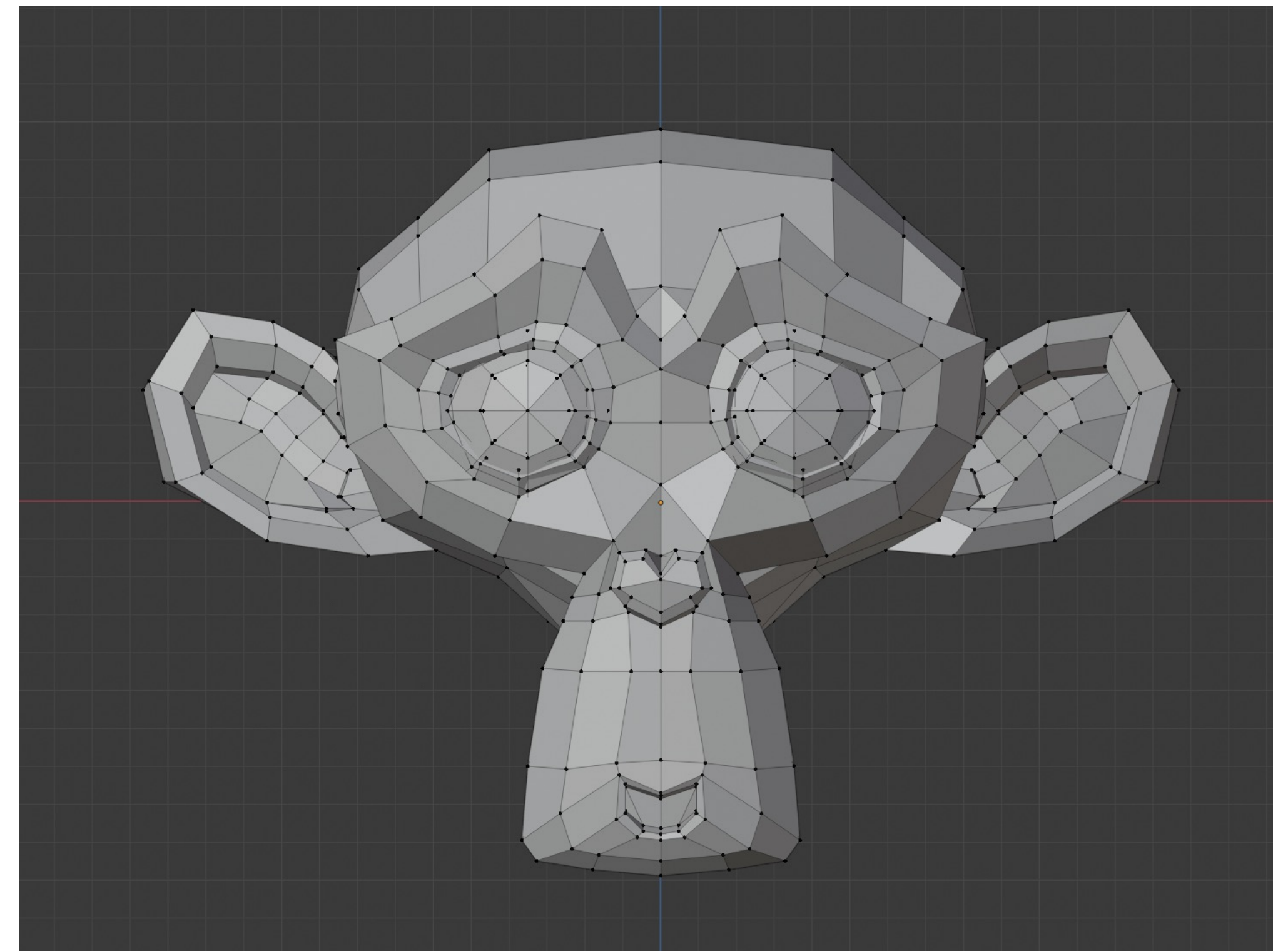
- adding new objects
- manipulation of entire object
- limited options of manipulation
 - translation
 - rotation
 - scalation
- joining objects
- applying modifiers
- setting up the whole scene





Edit mode

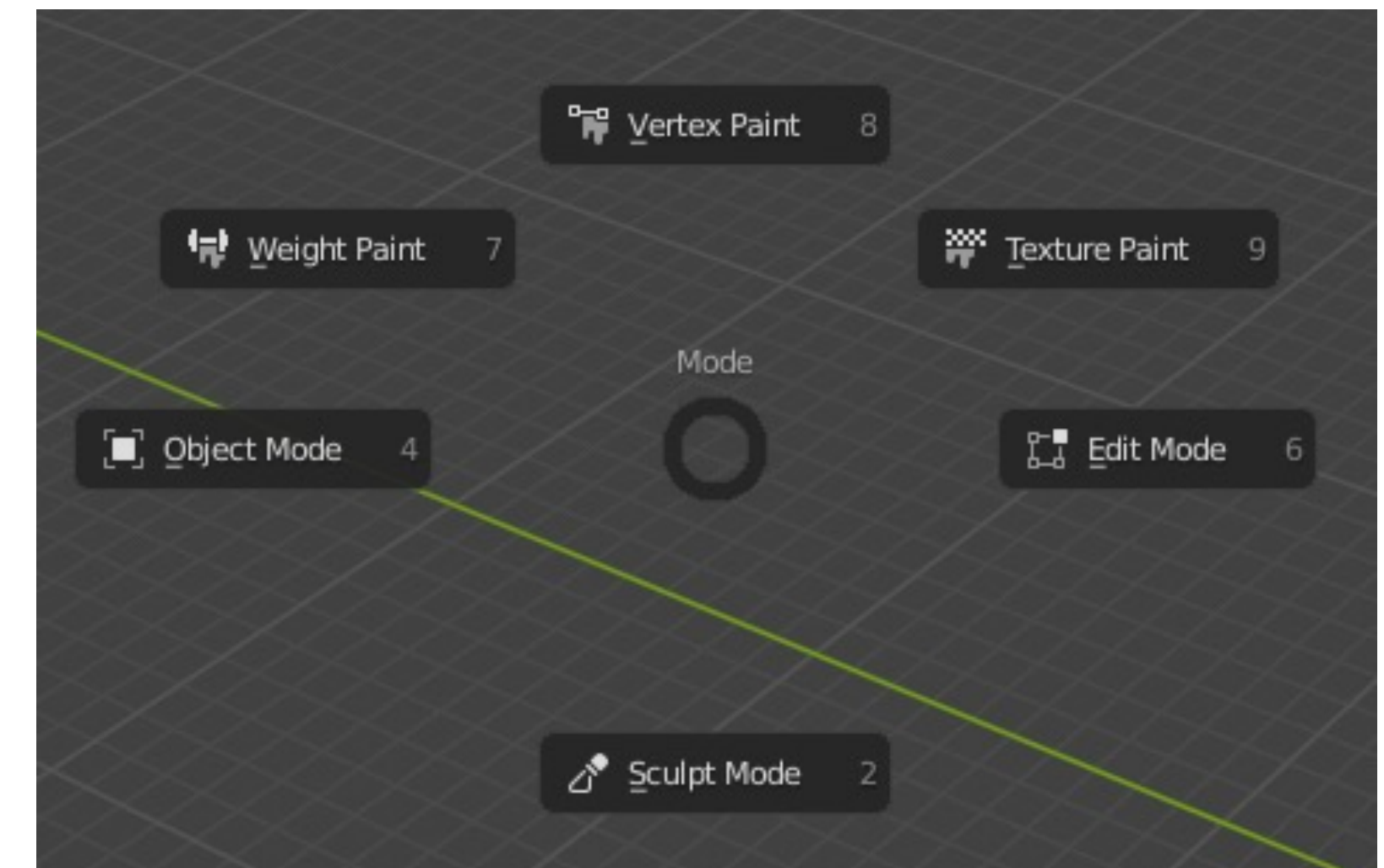
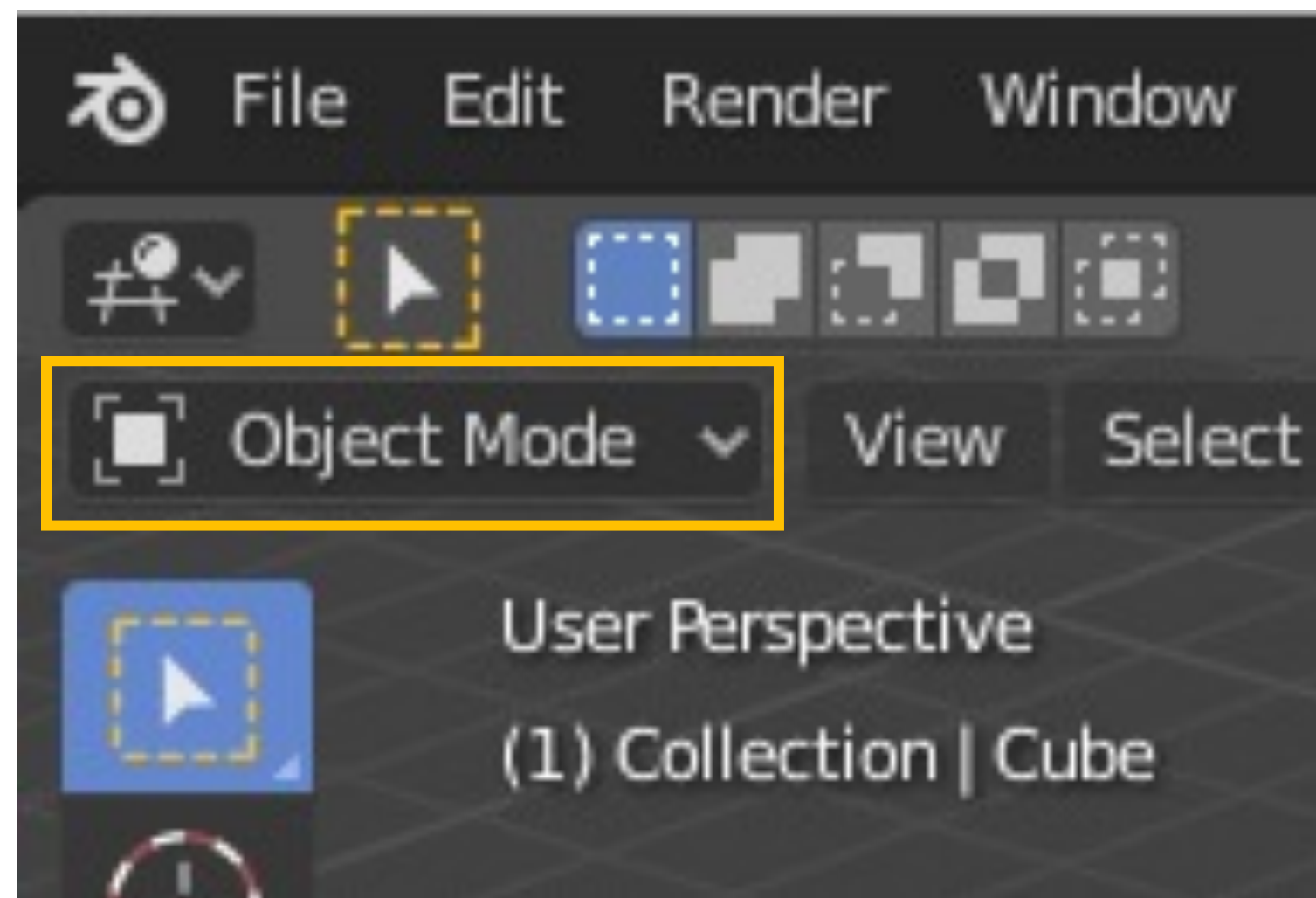
- creating detailed polygon mesh
- influences only object's geometry and not on it's global properties (location)
- select certain parts of the model
 - vertices
 - edges
 - faces
- assigning materials to certain parts of model





Switching between modes

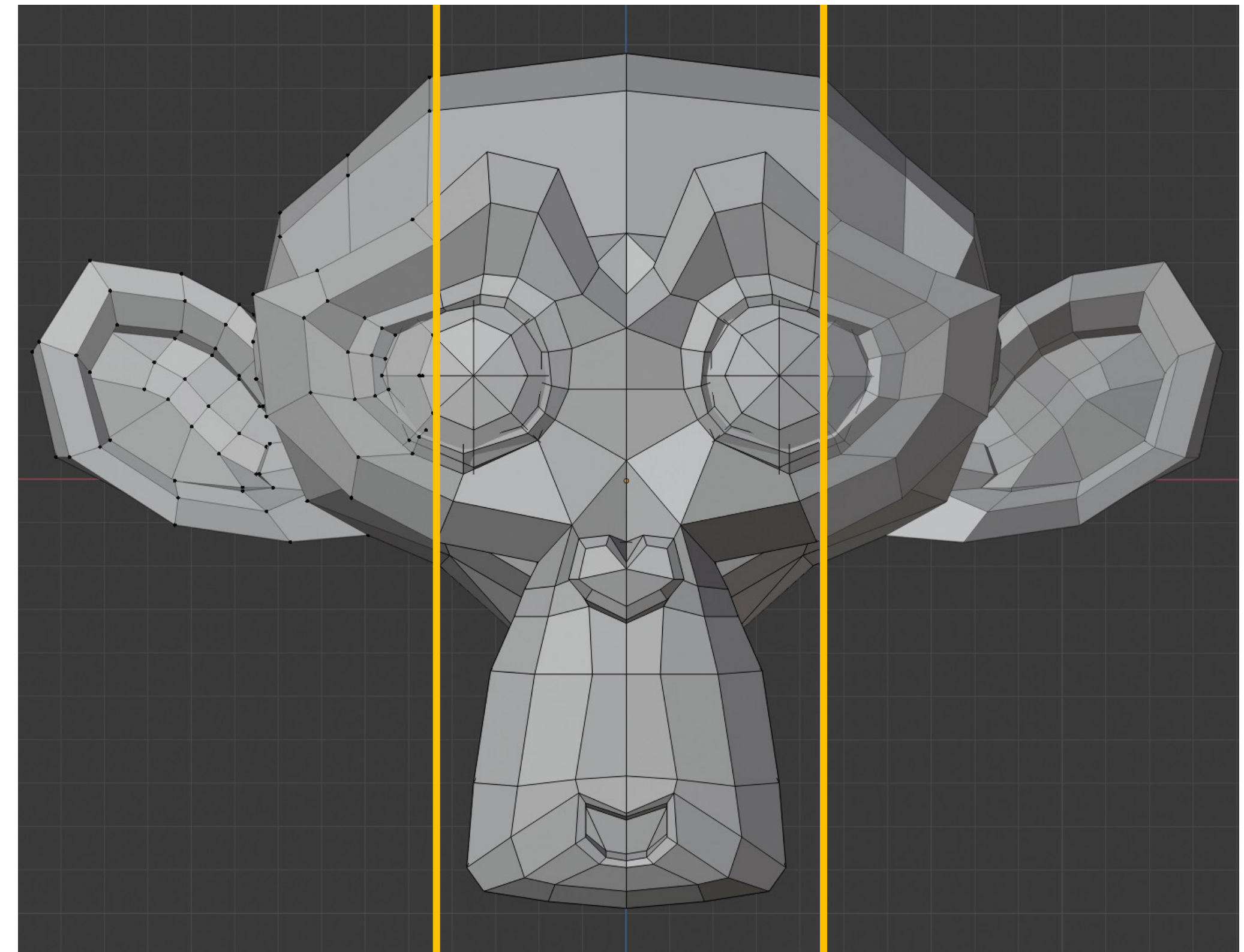
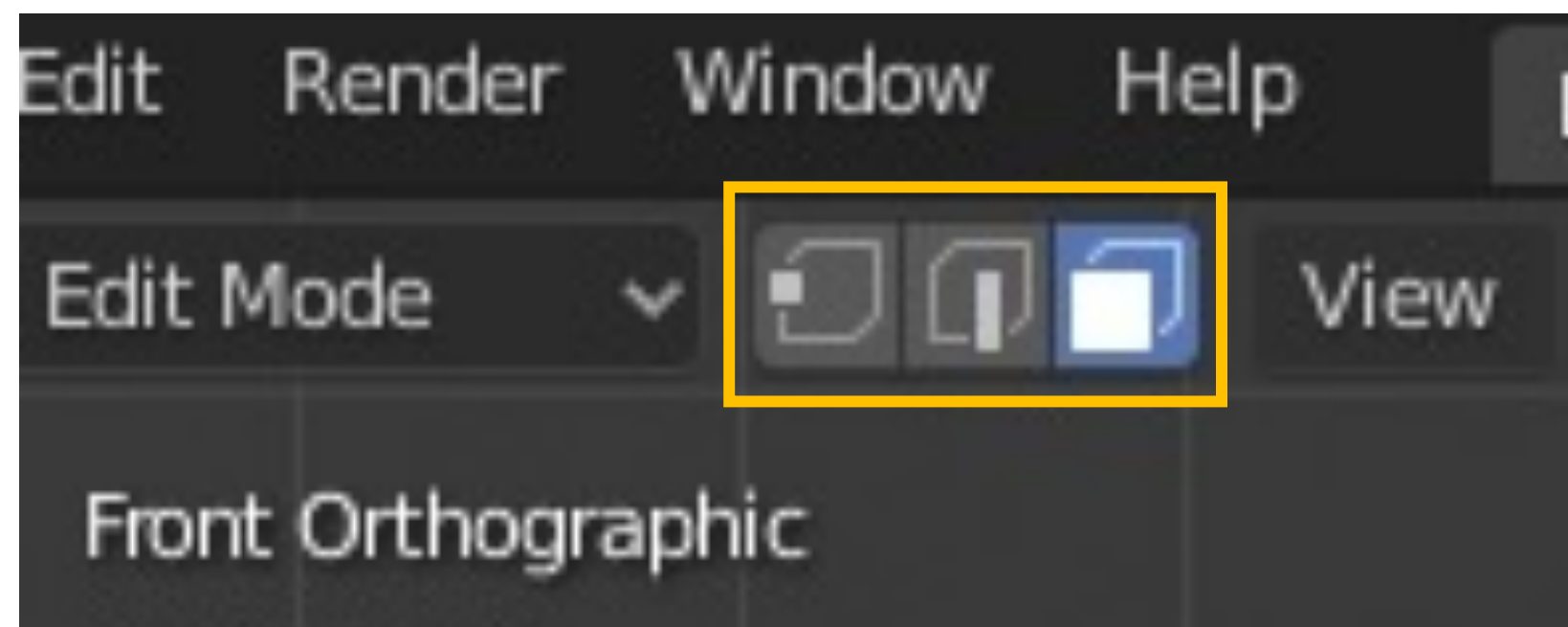
- **TAB** => switching between object and edit mode
- **CTRL + TAB** => circular menu to switch between all available nodes
- selection in the top left menu





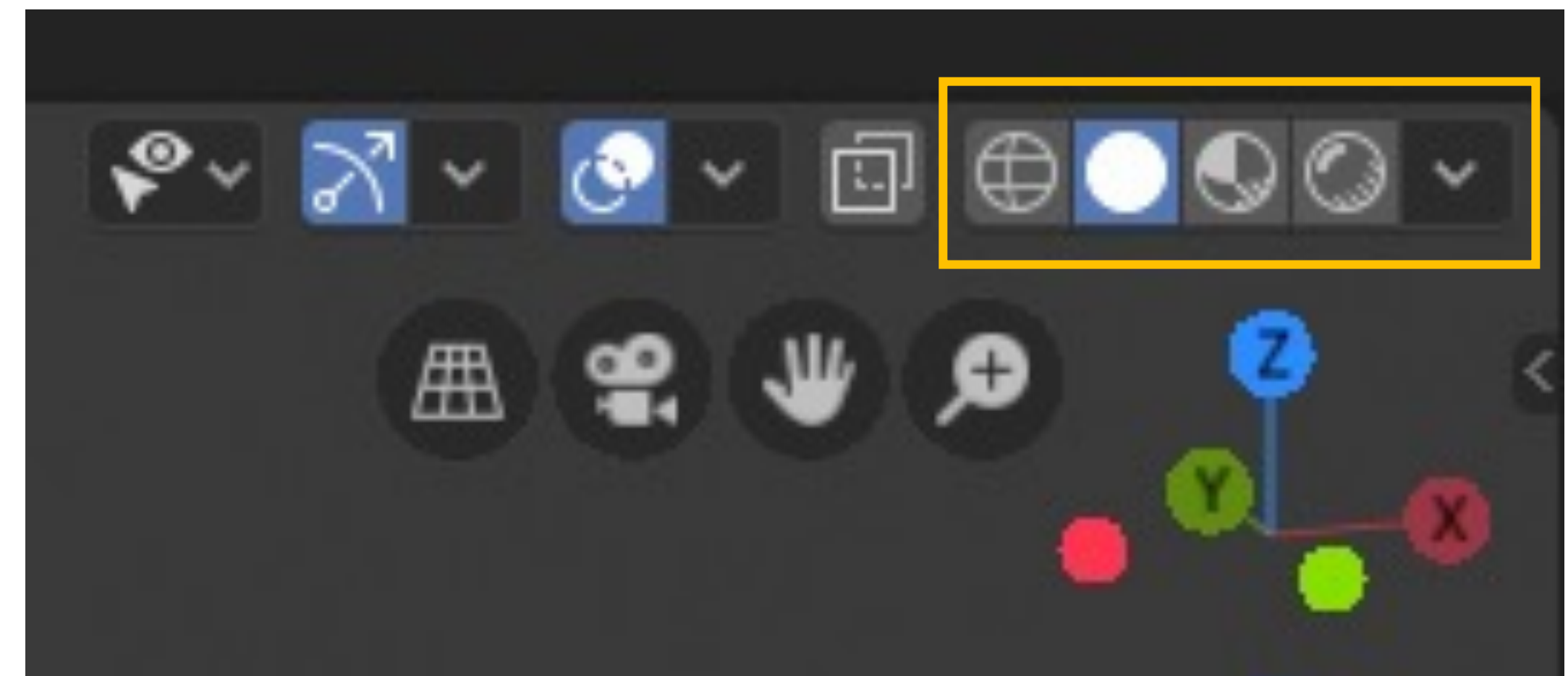
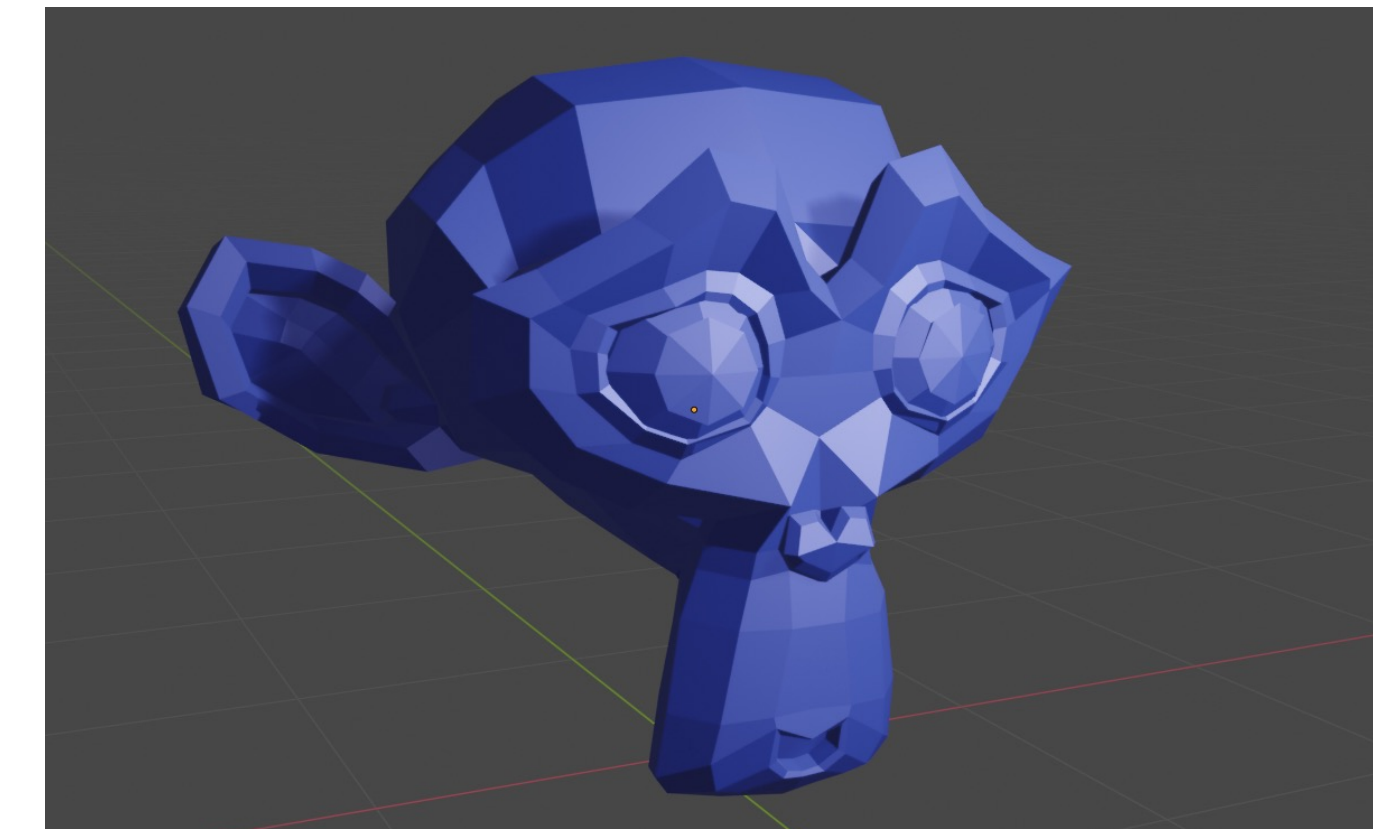
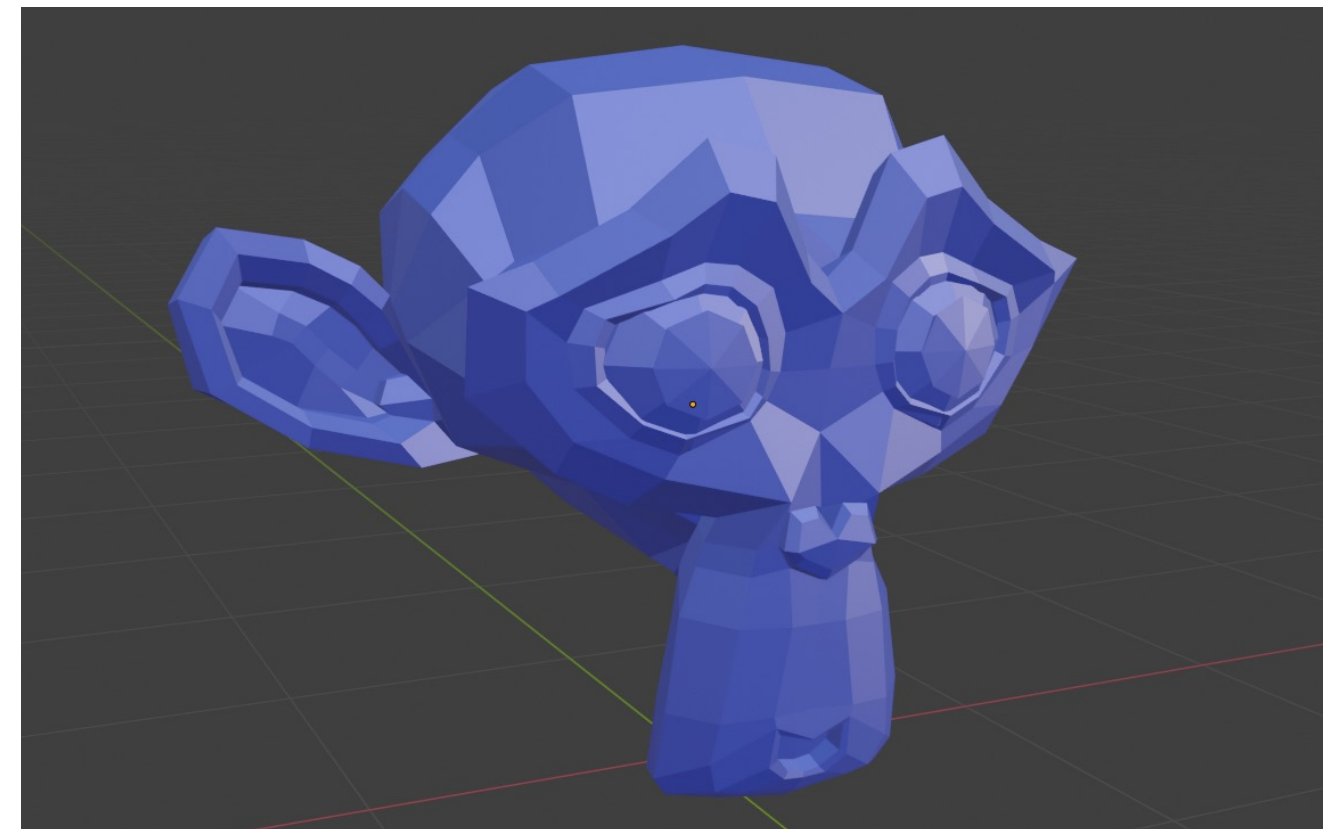
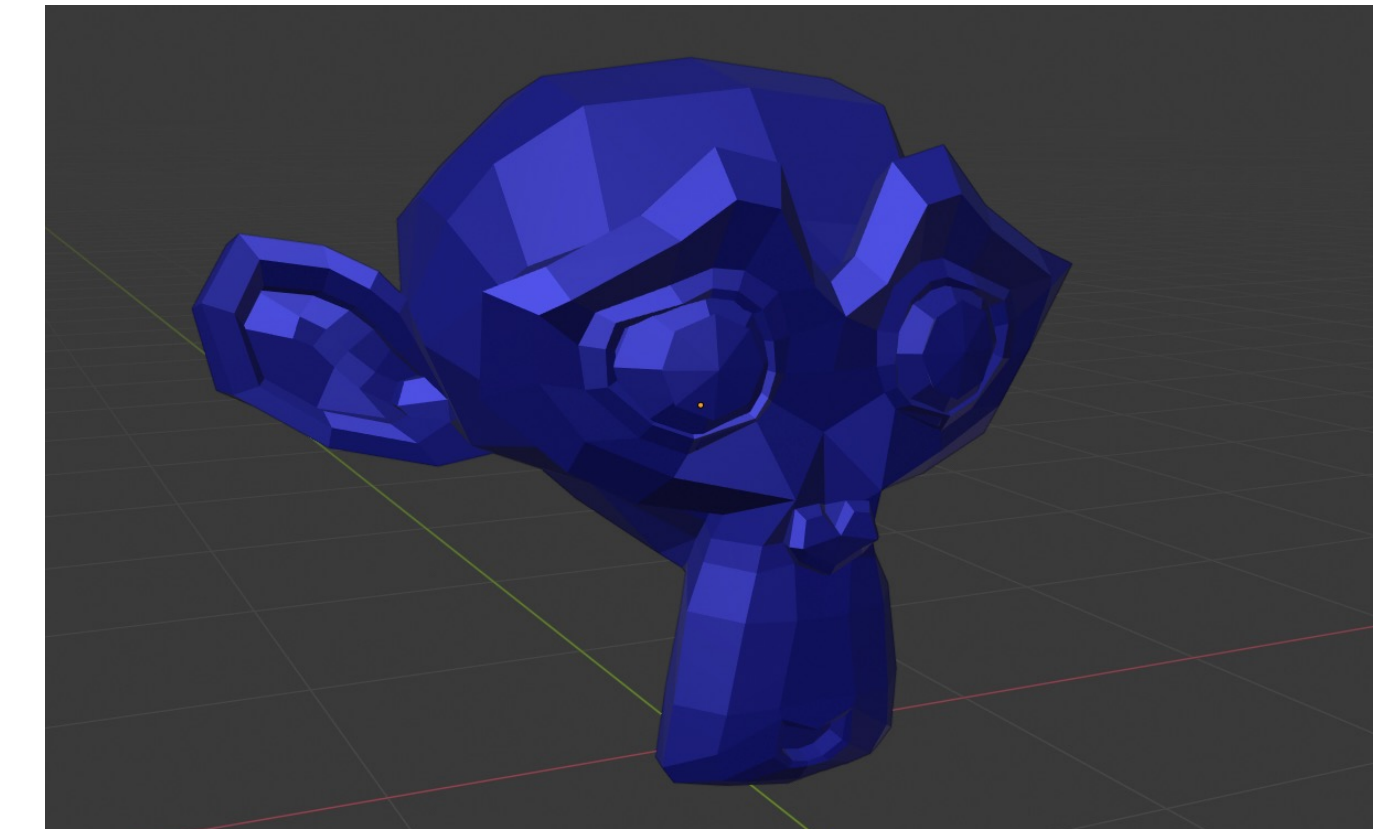
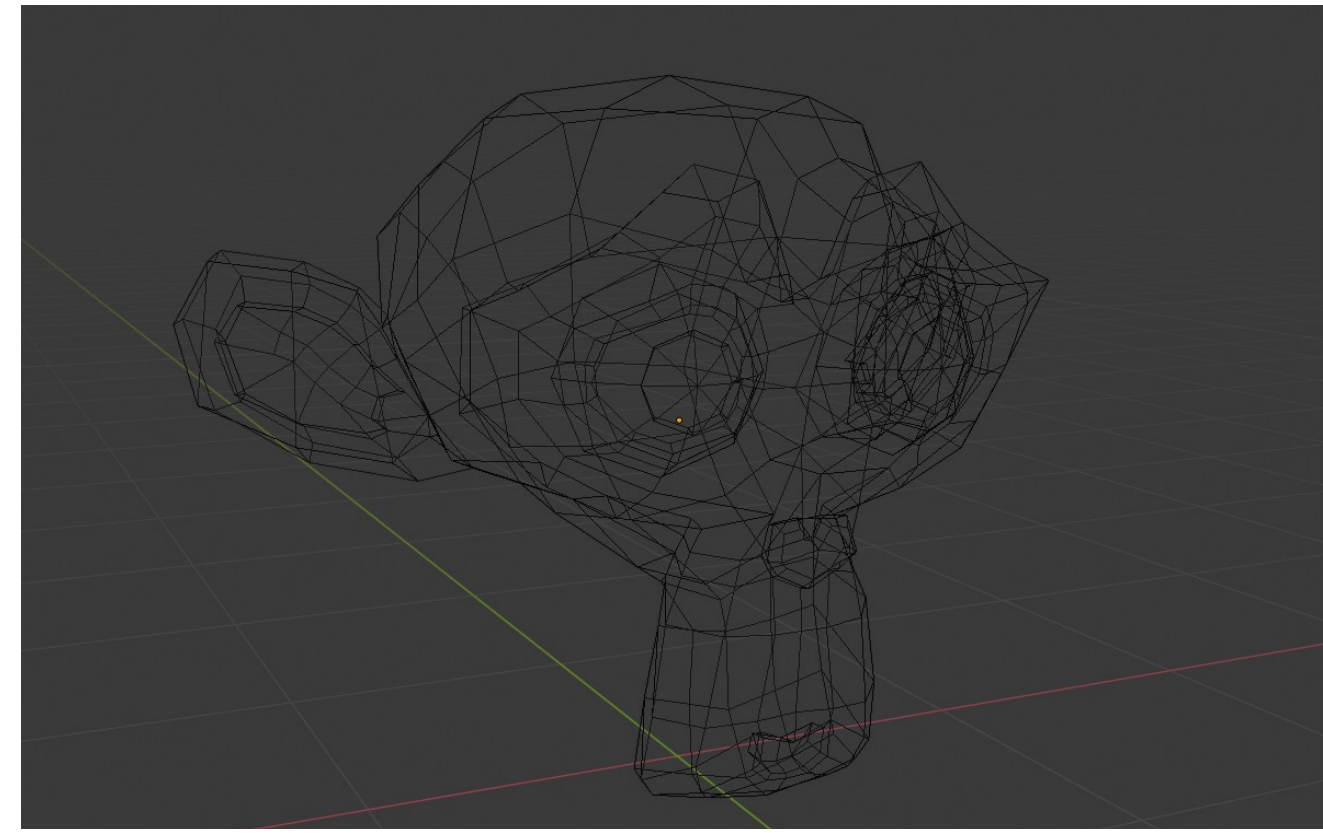
Mesh selection modes

- different selection modes (edit mode)
 - vertex select => **1**
 - edge select => **2**
 - face select => **3**
- selection in top left menu



Viewport shading

- four options
 - wireframe
 - solid
 - material preview
 - rendered
- select in top right menu
- select in circular menu => **Z**





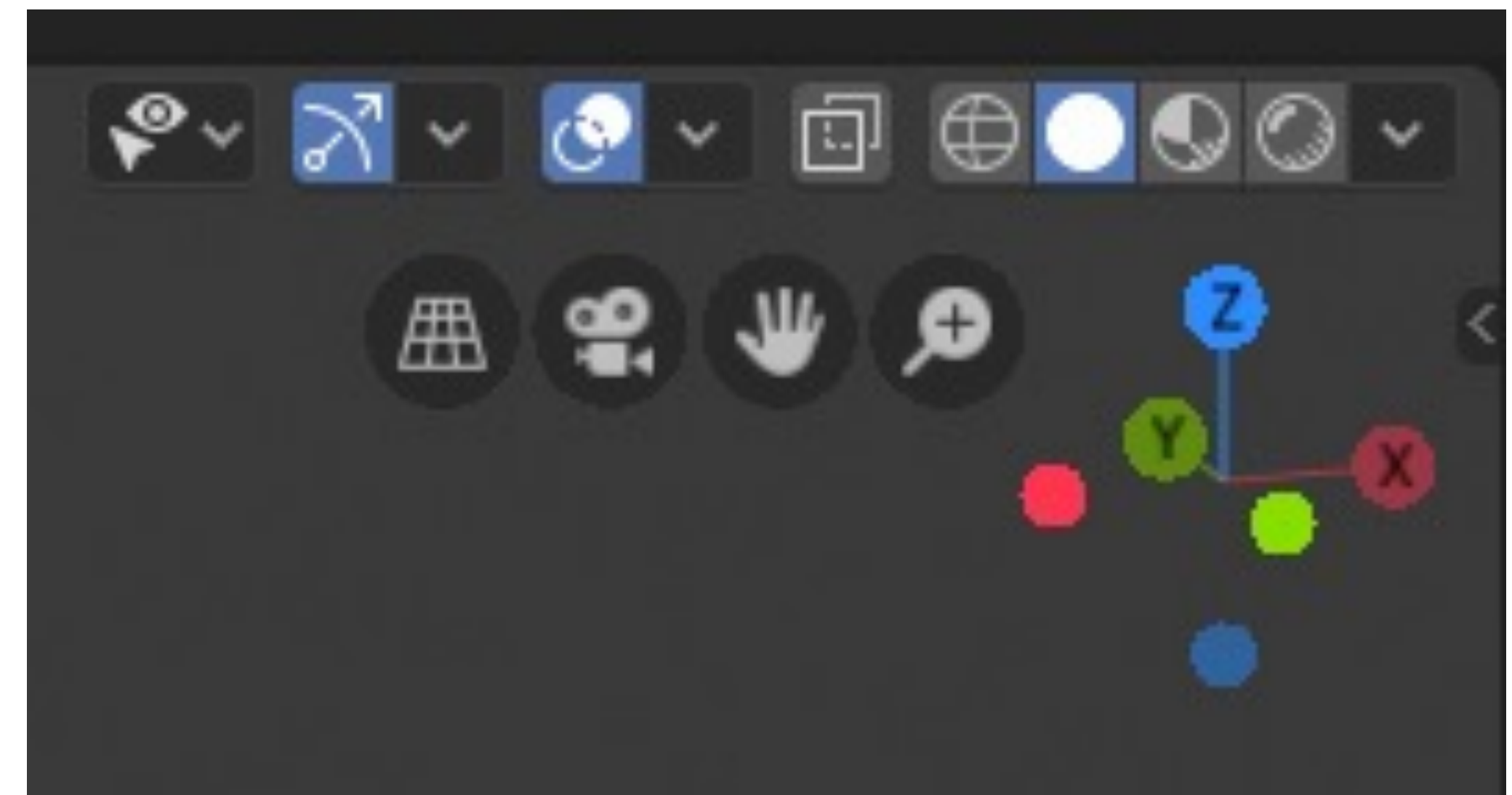
Adjusting view

- **Numpad1** => front view
- **Numpad3** => right view
- **Numpad7** => top view
- **Numpad5** => swap between perspective and orthographic view
- **Numpad9** => opposite view
- **CTRL + Numpad1** => back view
- **CTRL + Numpad3** => left view
- **CTRL + Numpad7** => bottom view
- **Numpad0** => camera view

Adjusting view (mouse)

- left button – selection
- movements (magic mouse)
 - scroll – rotation around object
 - scroll + **SHIFT** – pan
 - scroll + **CTRL** – zoom in/out
- movements (3 button mouse)
 - hold MMB – rotation around the object
 - hold MMB + **SHIFT** – pan
 - scroll – zoom in/out

- same functionality can be achieved by using buttons in top right menu





creating objects

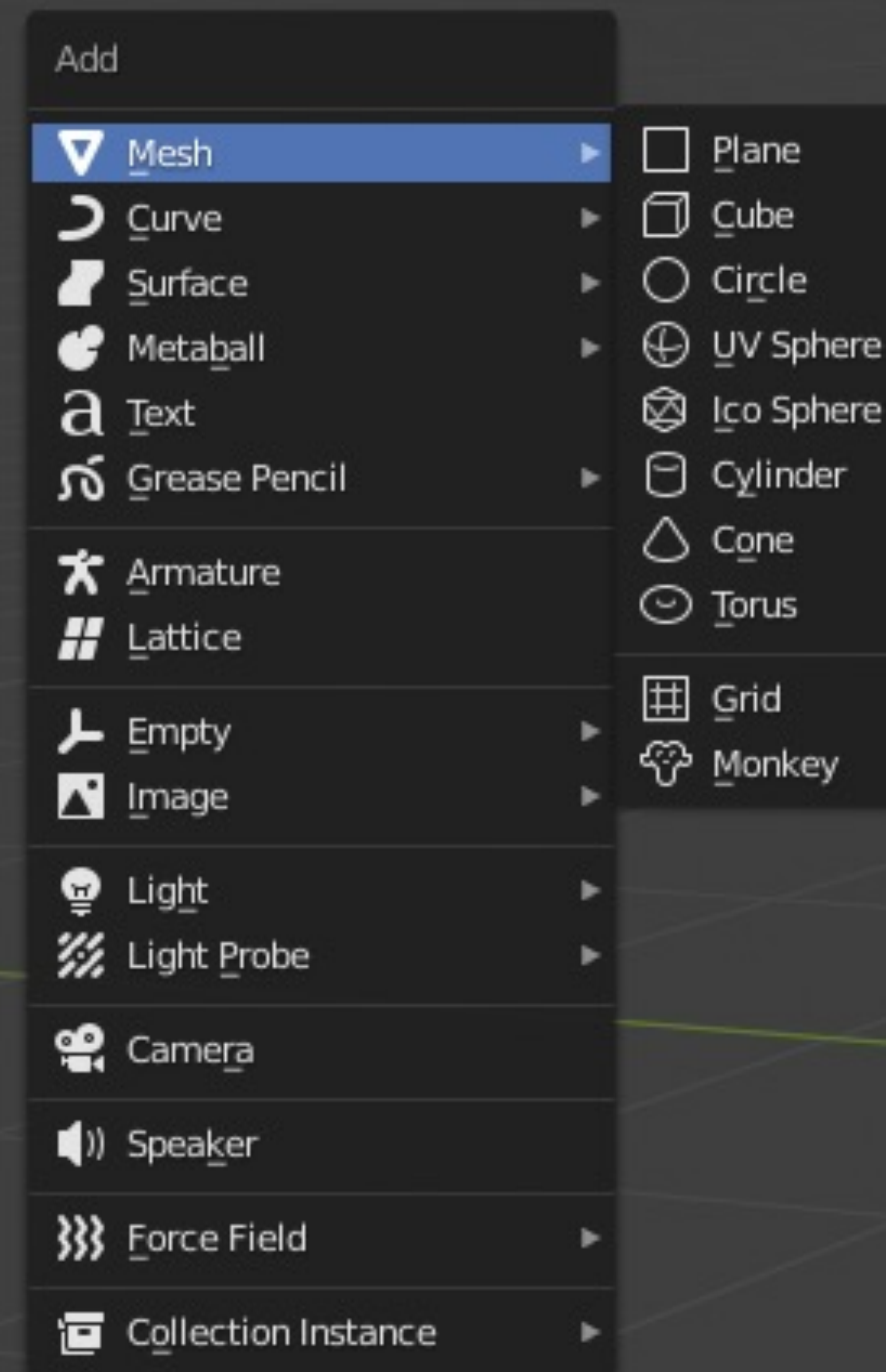


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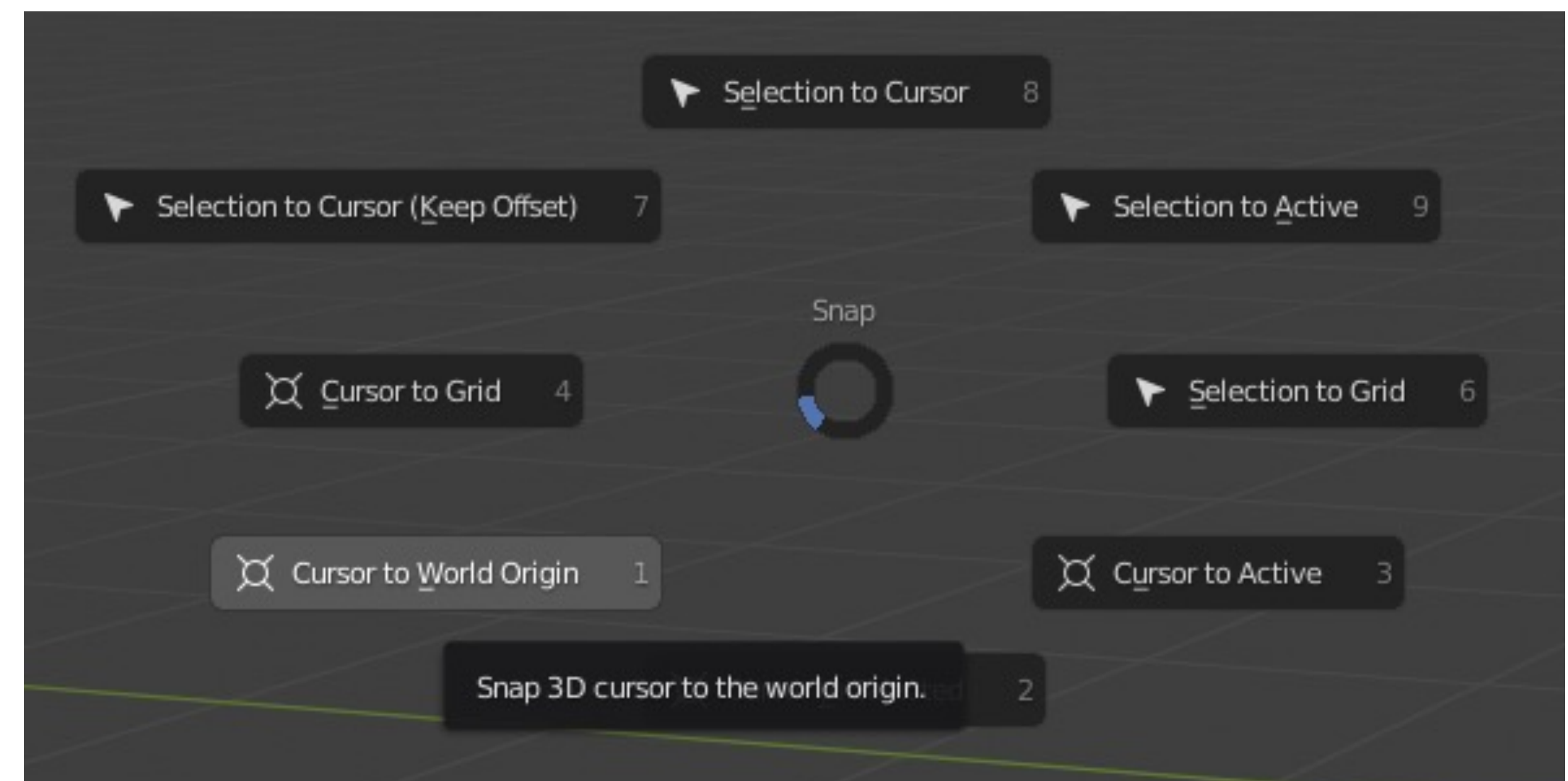
Adding new object

- in OBJECT mode
- shortcut – **SHIFT + A**
- select appropriate object in the menu



Adding new object

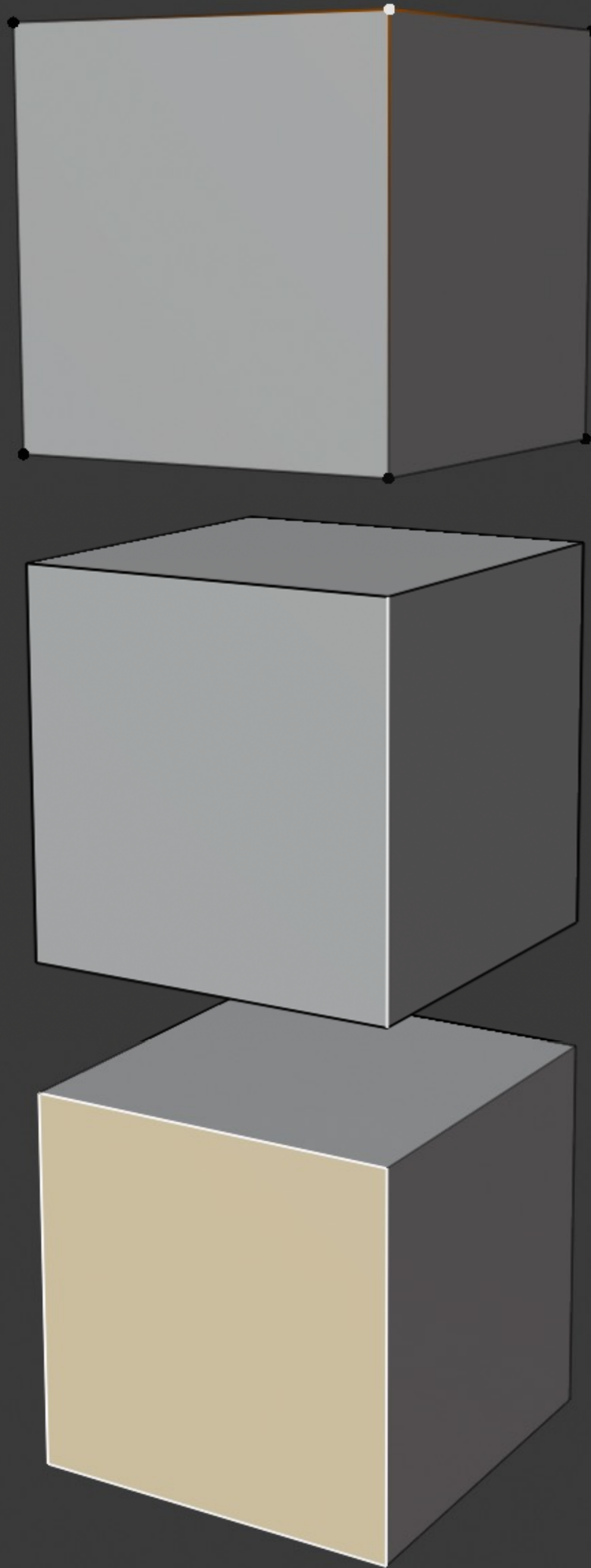
- object appears on the location of cursor
- before adding new object, cursor's position should be in the center
- shortcut – **SHIFT + S** -> **cursor to world origin**





Adjusting selection

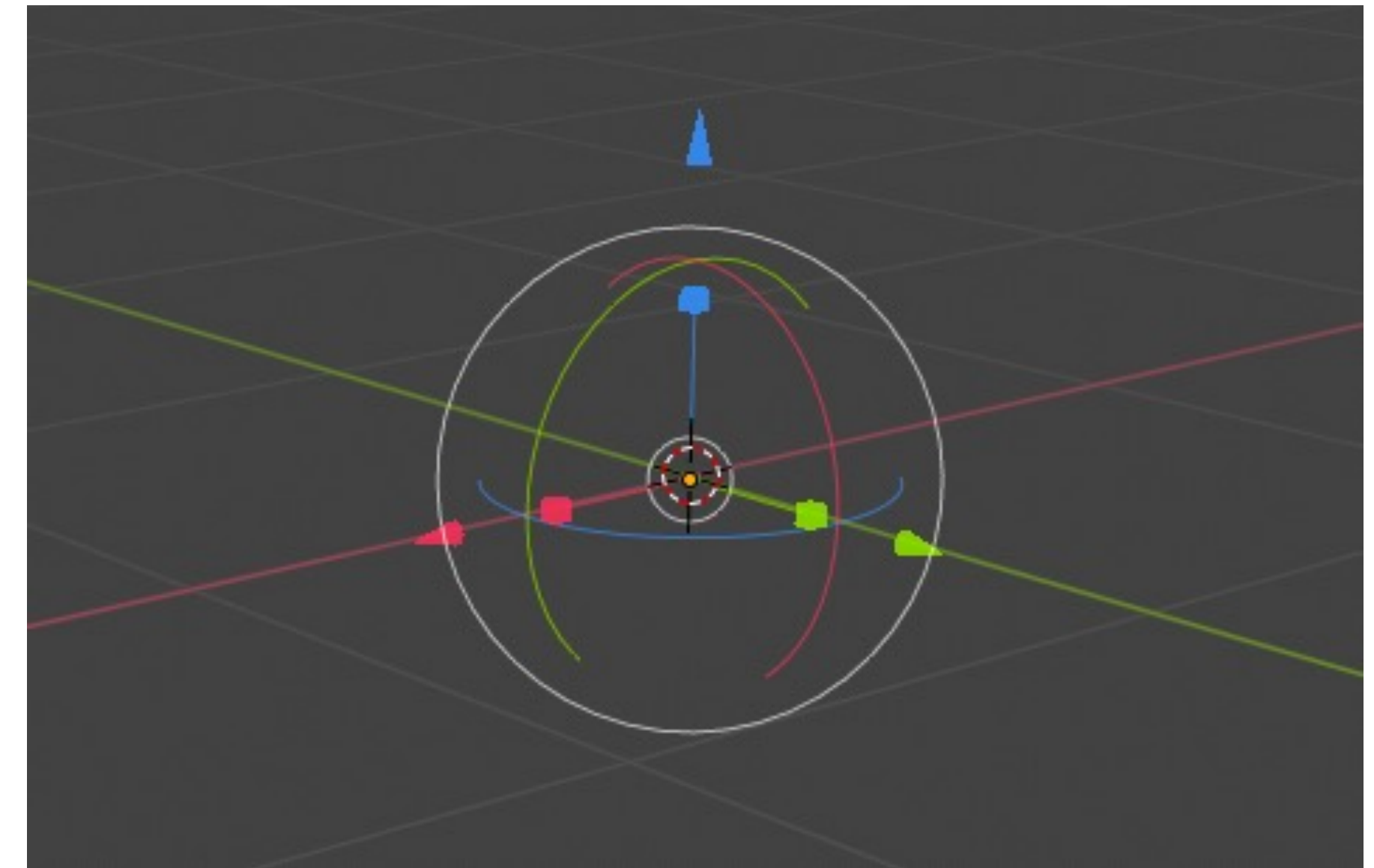
- components of polygon mesh
 - vertex
 - edge
 - face
- different selection modes (edit mode)
 - vertex select => **1**
 - edge select => **2**
 - face select => **3**





Transform options

- transform options
 - translation (default mode, after selection)
 - rotation => **R**
 - scaling => **S**
- transforming variations
 - free movement => **G**
 - one axis movement => **X / Y / Z**





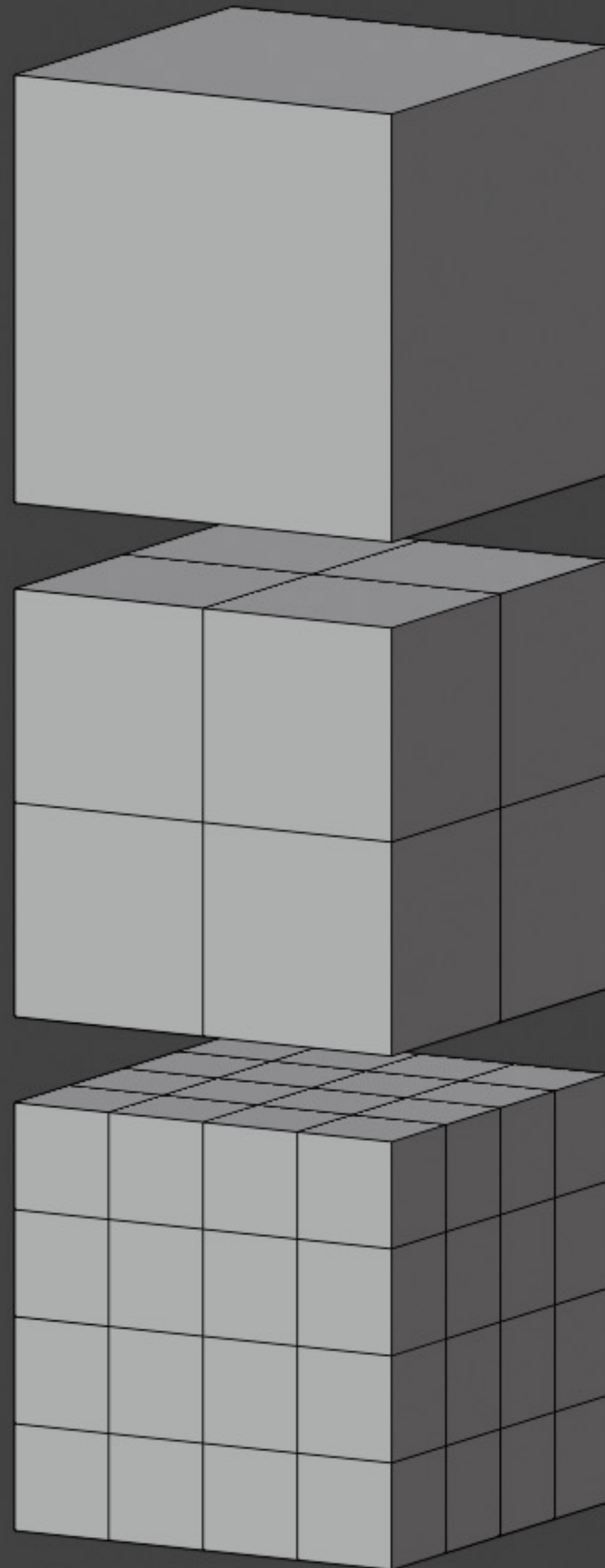
Tools

- extrude
- inset
- bevel
- loop cut
- knife
- smooth
- subdivide
- fill
- bridge
- merge
- delete in dissolve





Subdivide

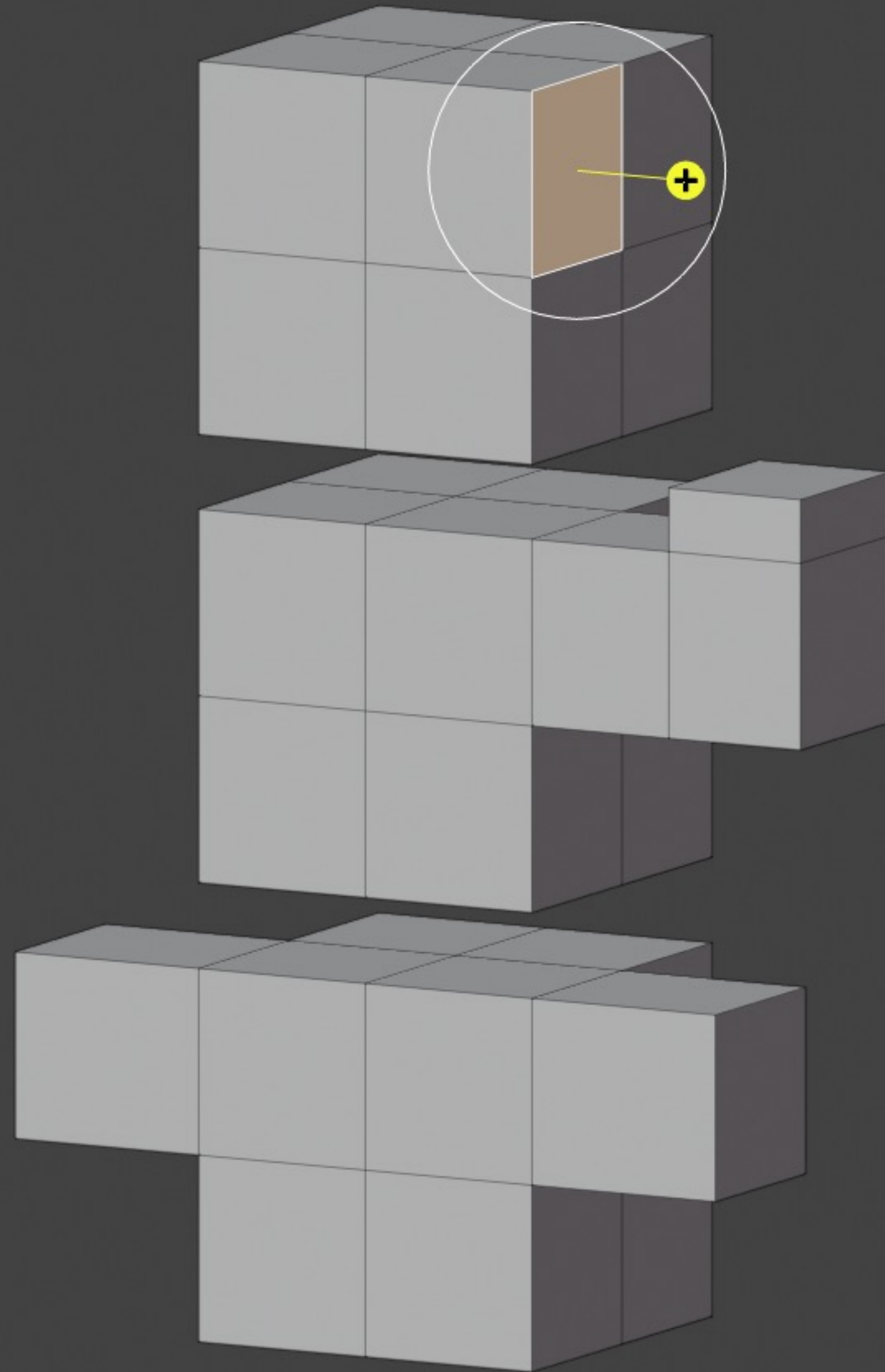


- splits selected edges and faces by cutting them in half
- adds resolution to the mesh
- not in T-menu, no shortcut
- right click => subdivide



Extrude

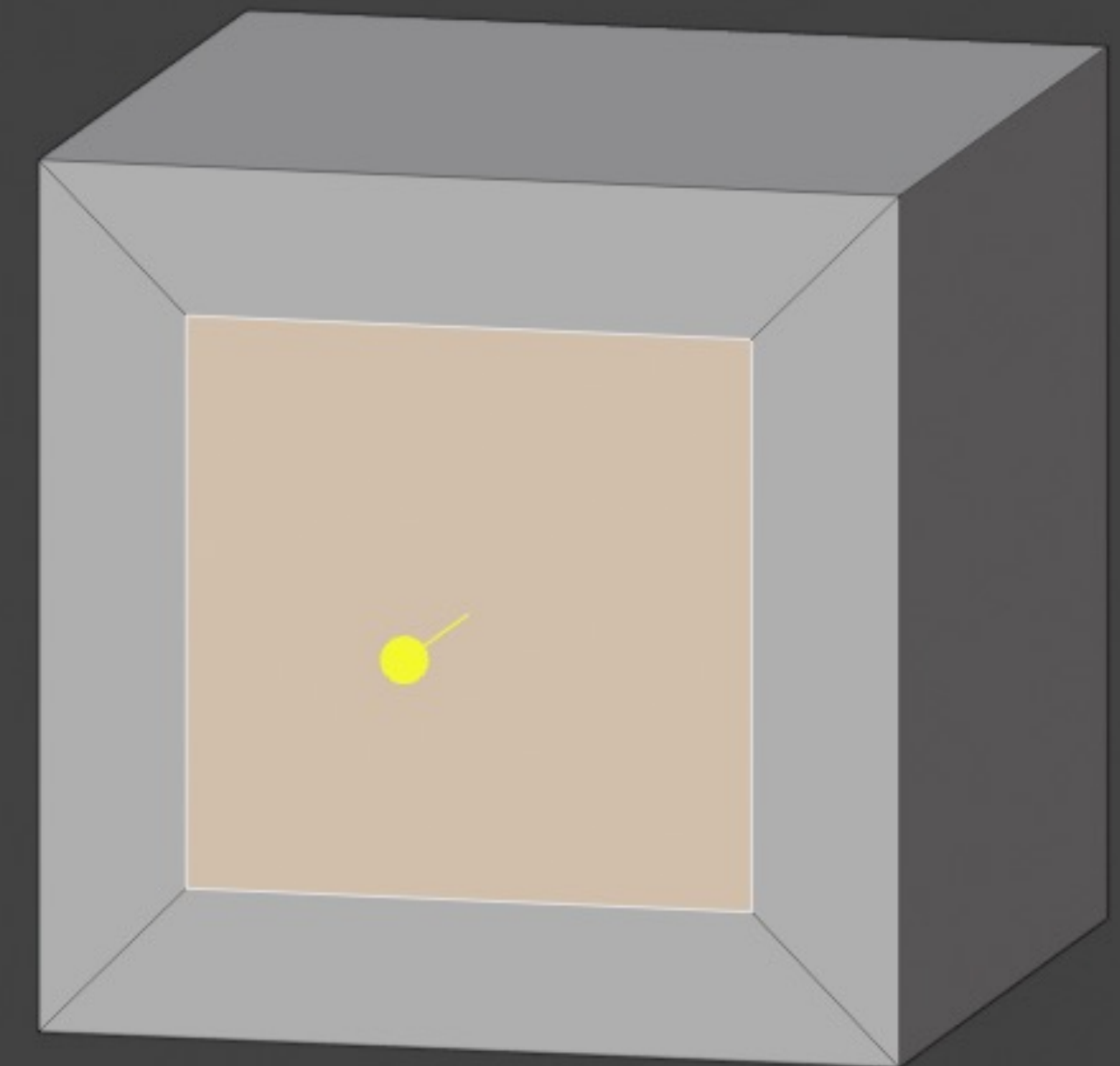
- shortcut – **E**
- additional extrude options – **ALT + E**
- create new geometry based off of already present one
- one of most important tools





Inset

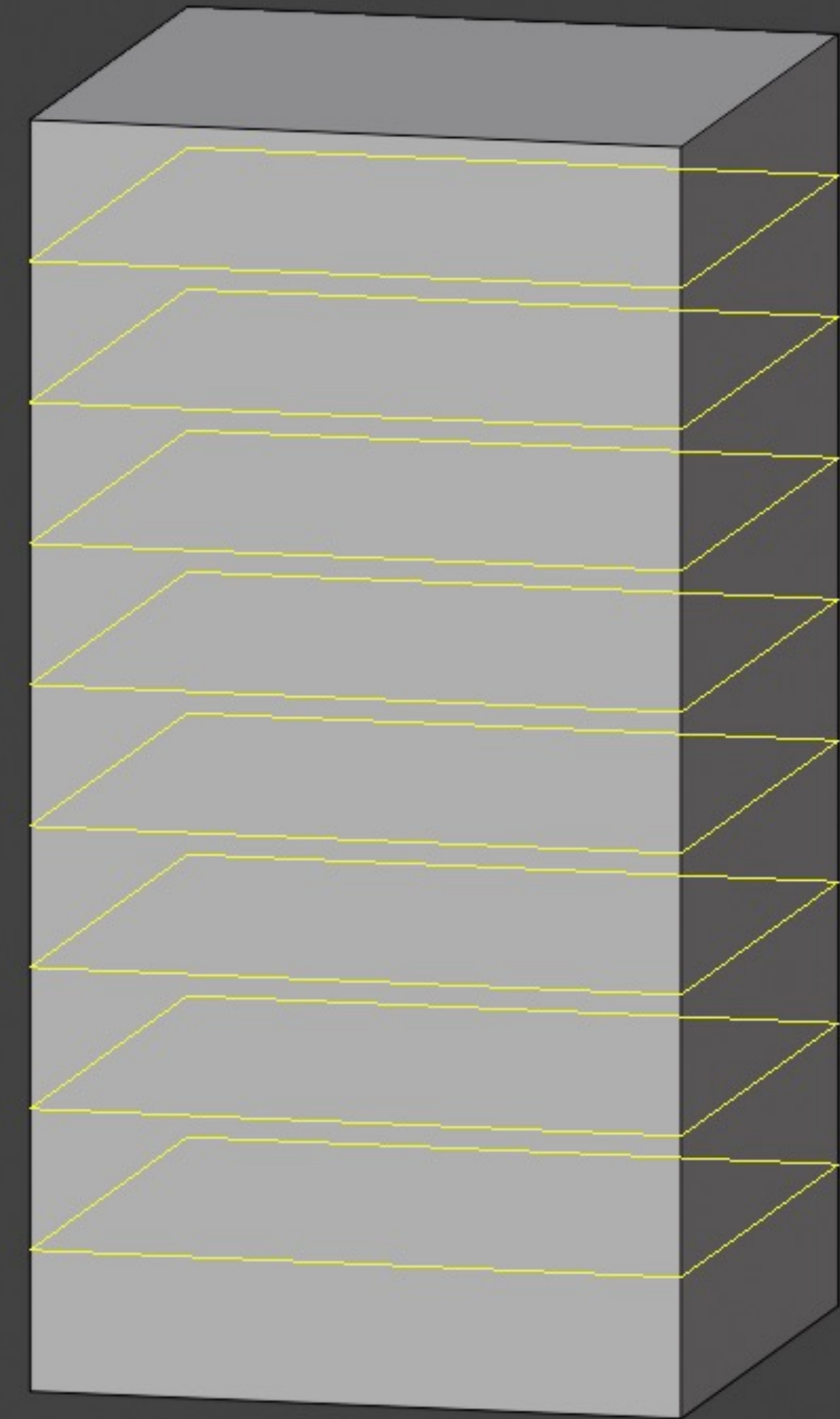
- shortcut – I
- takes currently selected faces and creates an inset of them
- adjustable thickness and depth





Loop cut

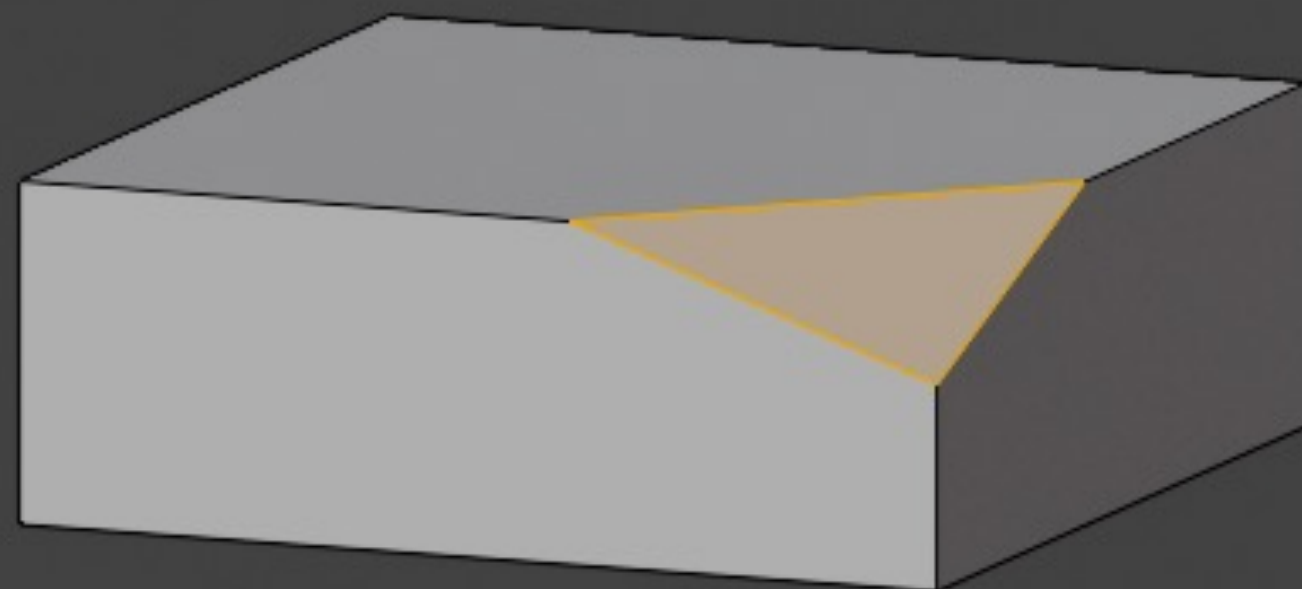
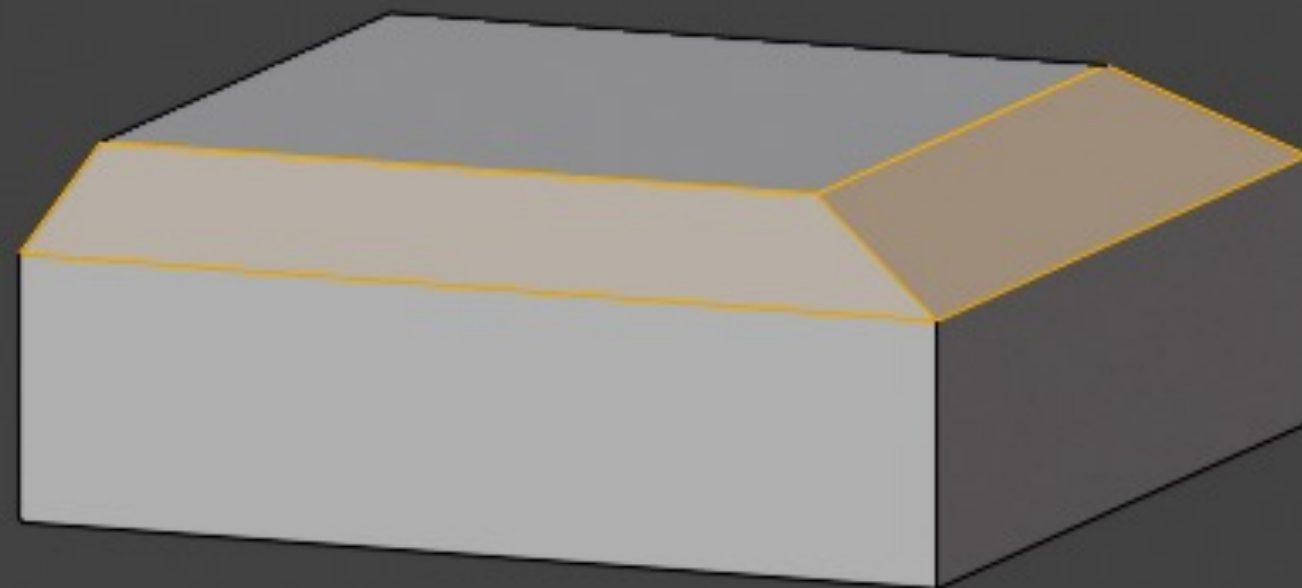
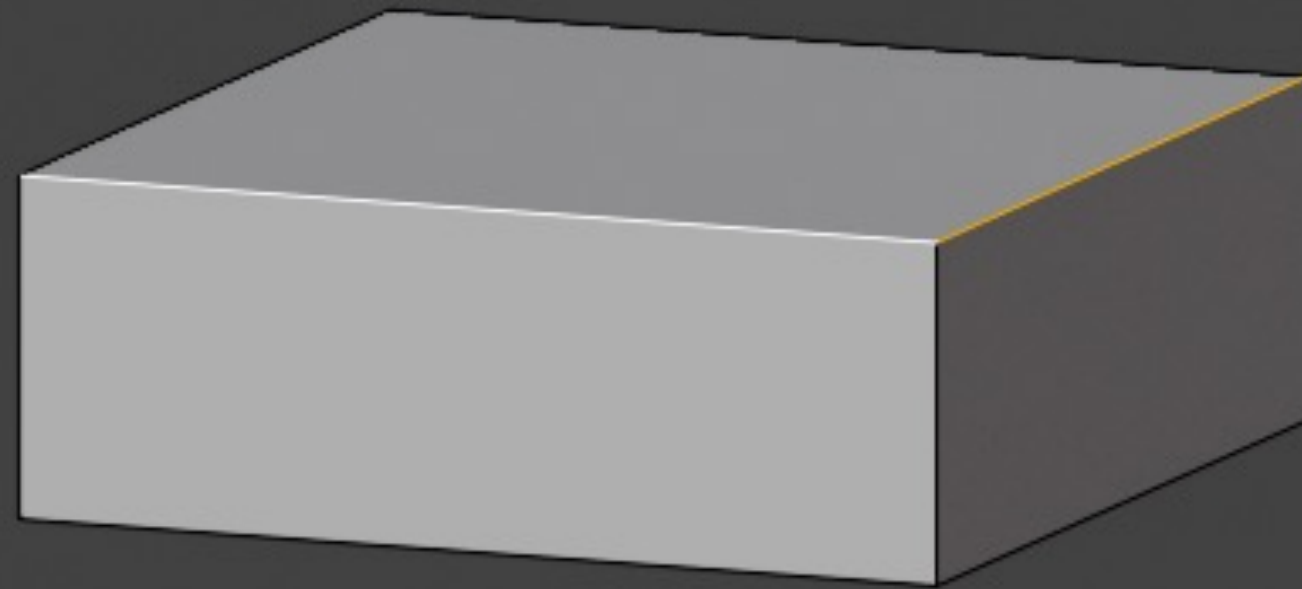
- shortcut – **CTRL + R**
- creates a loop of edges and cuts right through the object
- slide = move the loop to desired position
- multiple loops – **CTRL + R** + scroll wheel OR type number of loops





Bevel

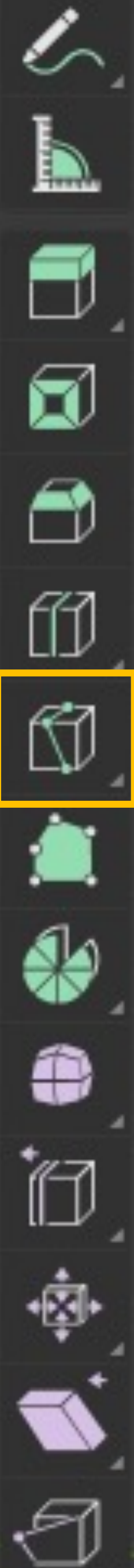
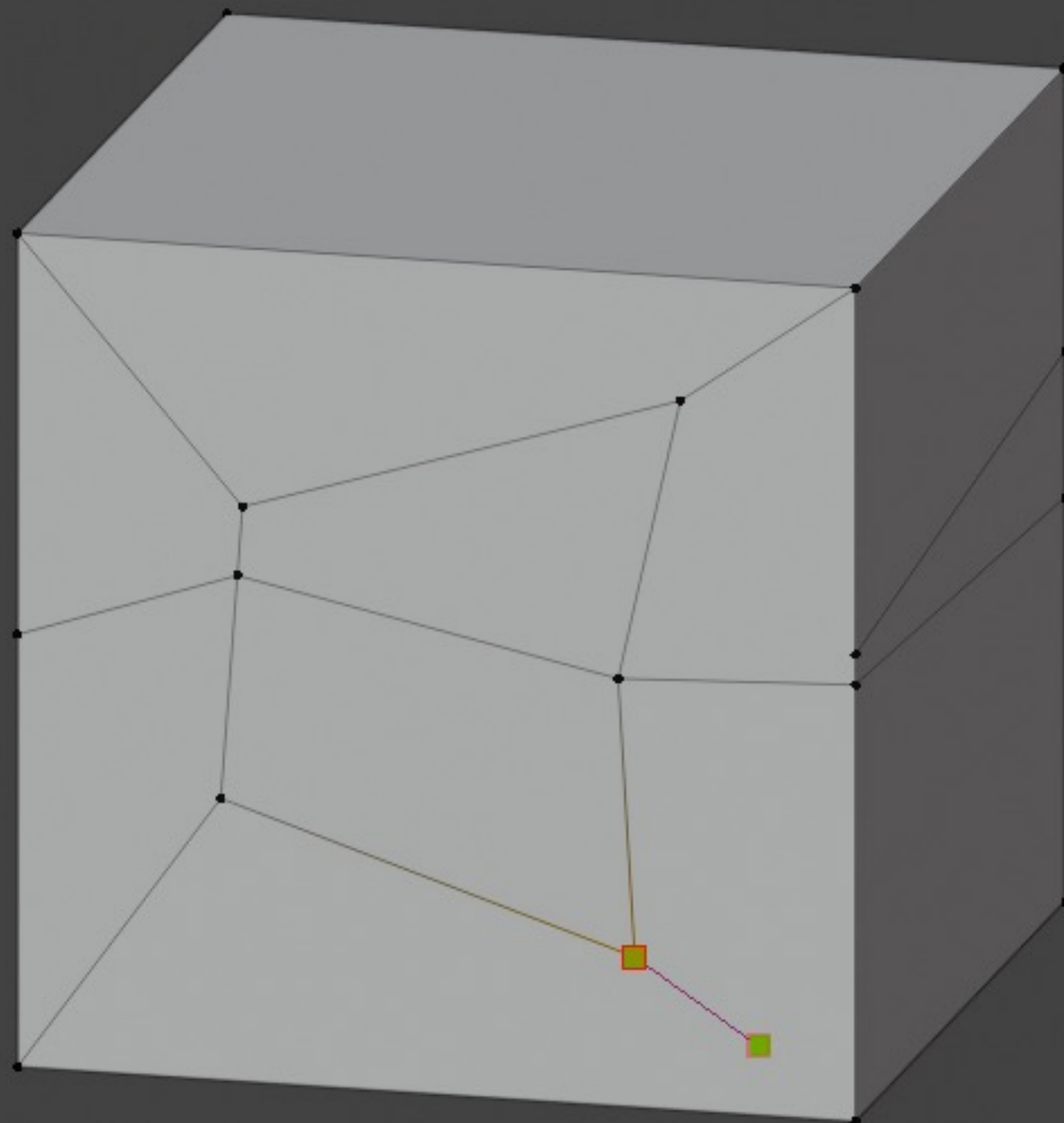
- shortcut – **CTRL + B**
- vertex bevel – CTRL + shift + B
- create rounded edges on geometry
- useful for giving realism to non-organic models





Knife

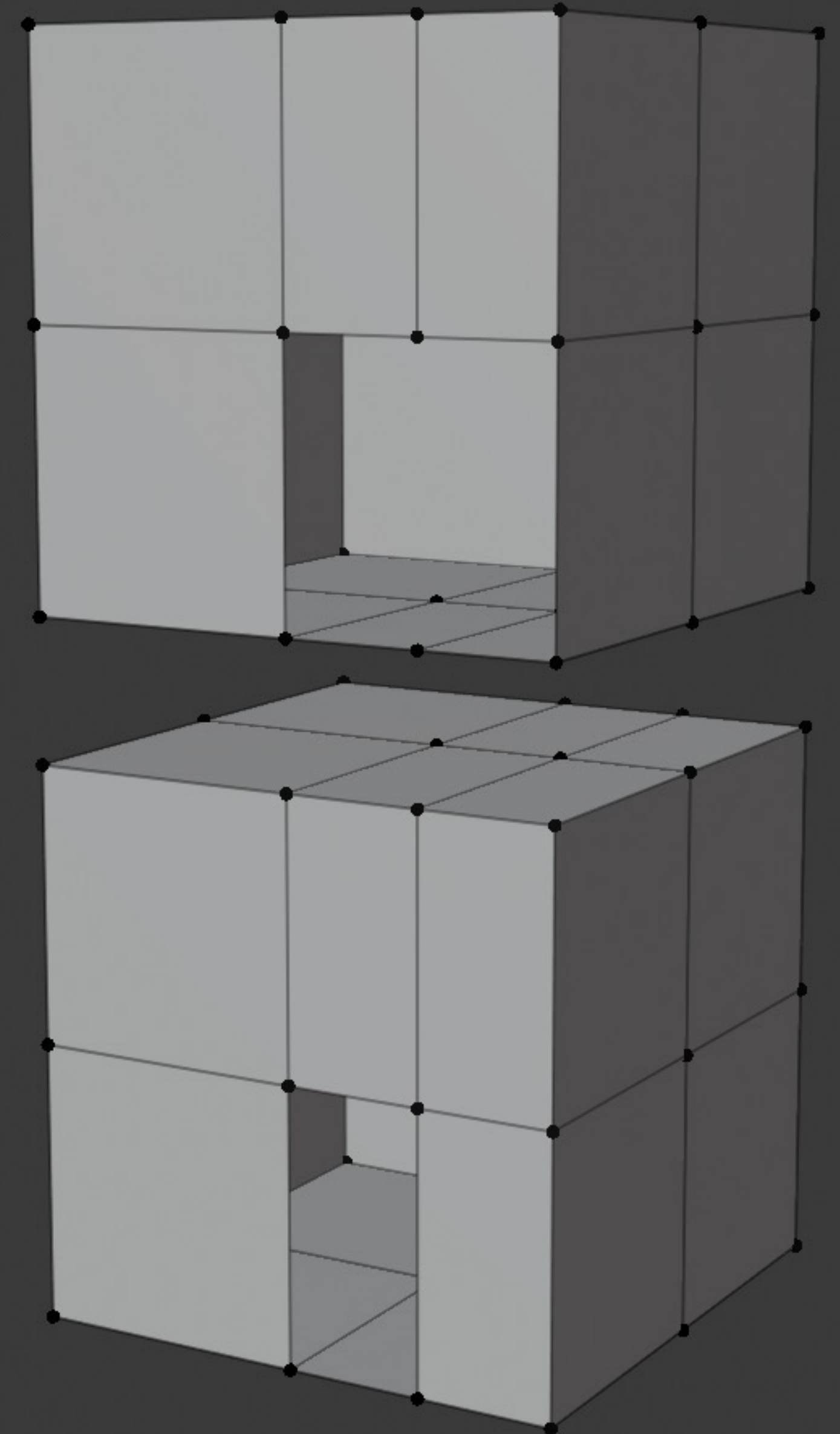
- shortcut – **K**
- interactively subdivide (cut up) geometry
- achieved by drawing lines or closed loops





Fill

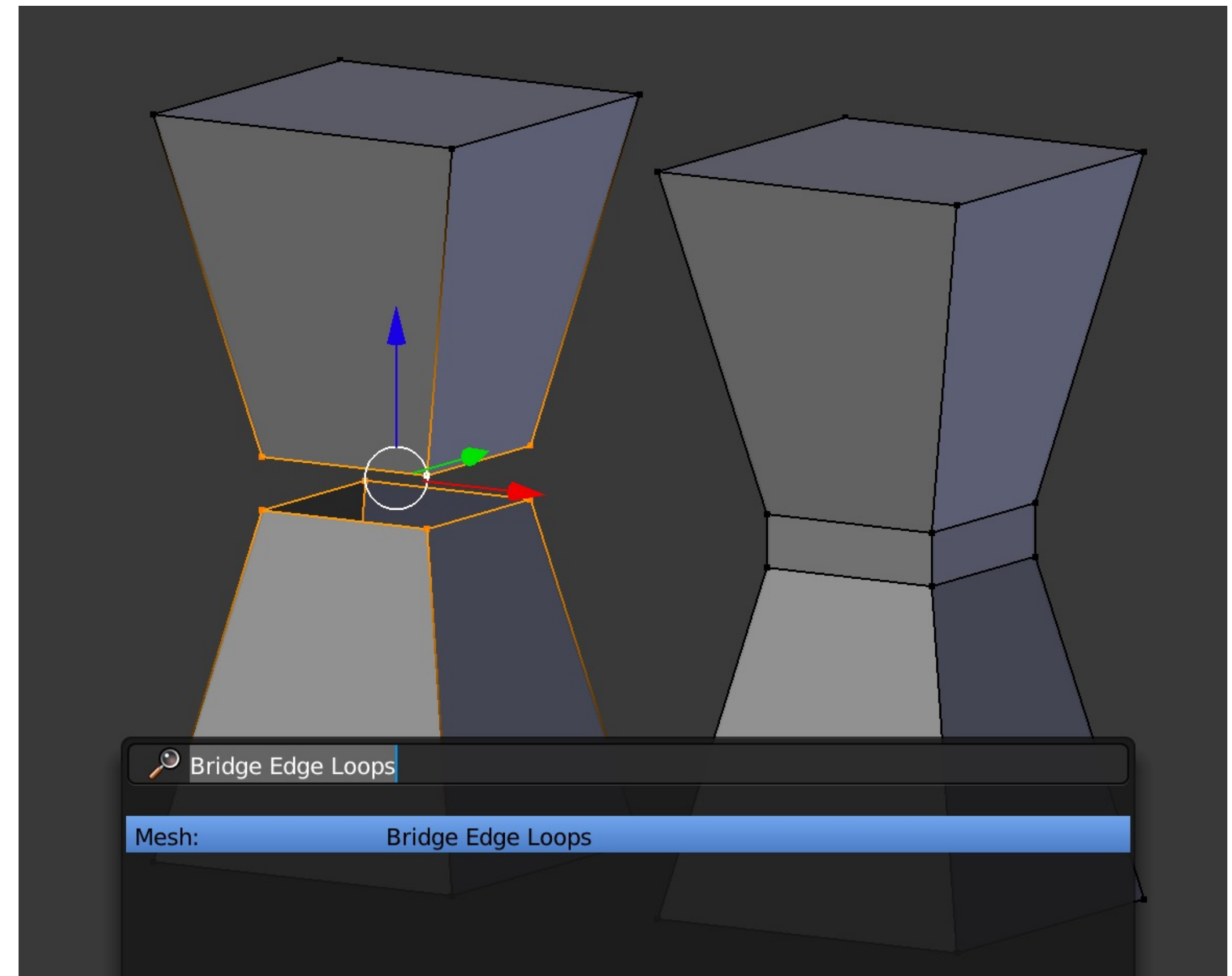
- shortcut – **F**
- creates geometry by filling in the selection
- before filling in, vertices or edges must be selected
 - 2 vertices selected => makes edge
 - multiple vertices / edges selected => makes face





Bridge

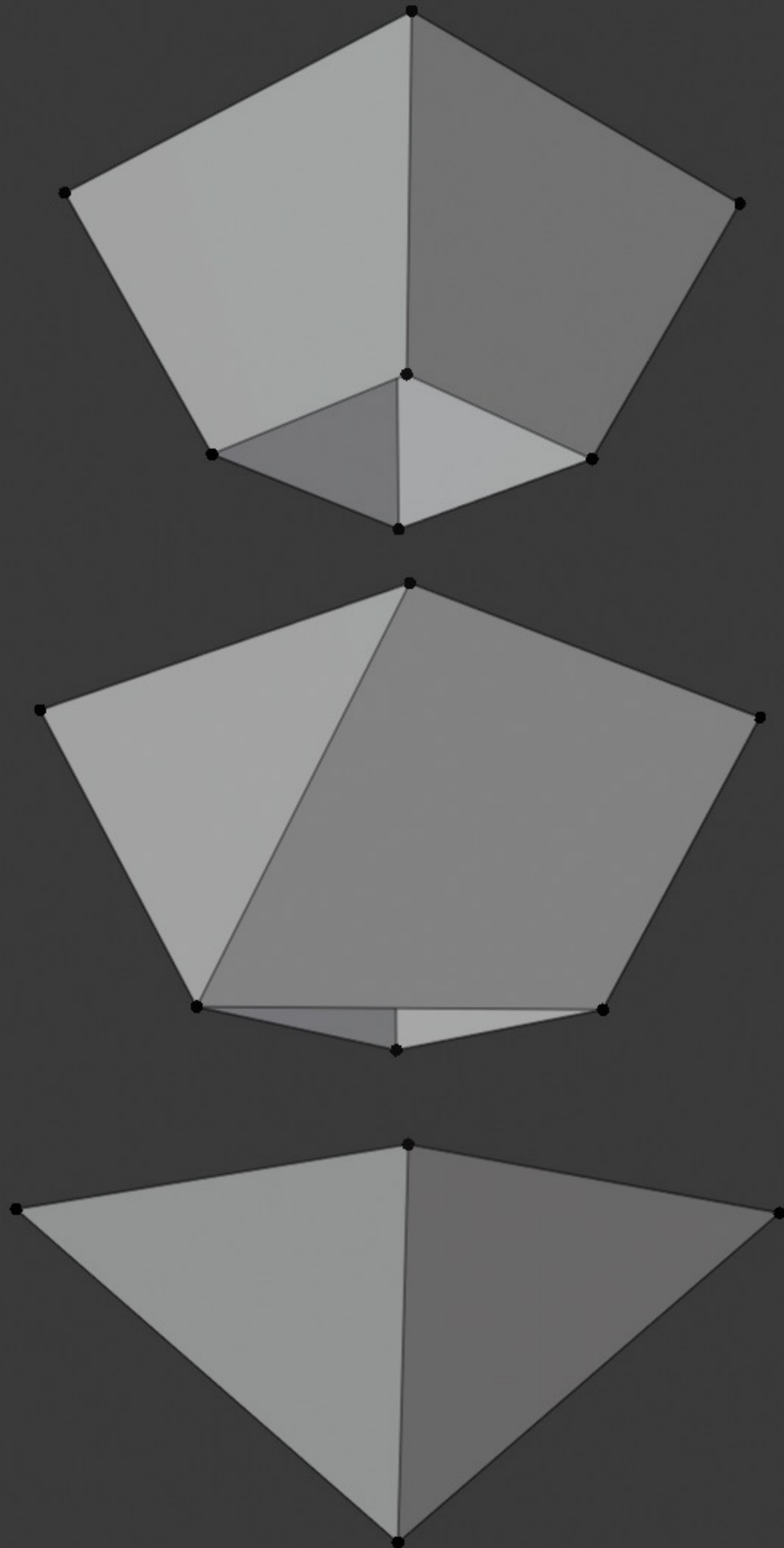
- connects multiple edge loops with faces
- **right click => bridge edge loops**
- **F3 (search) => bridge edge loops**





Merge

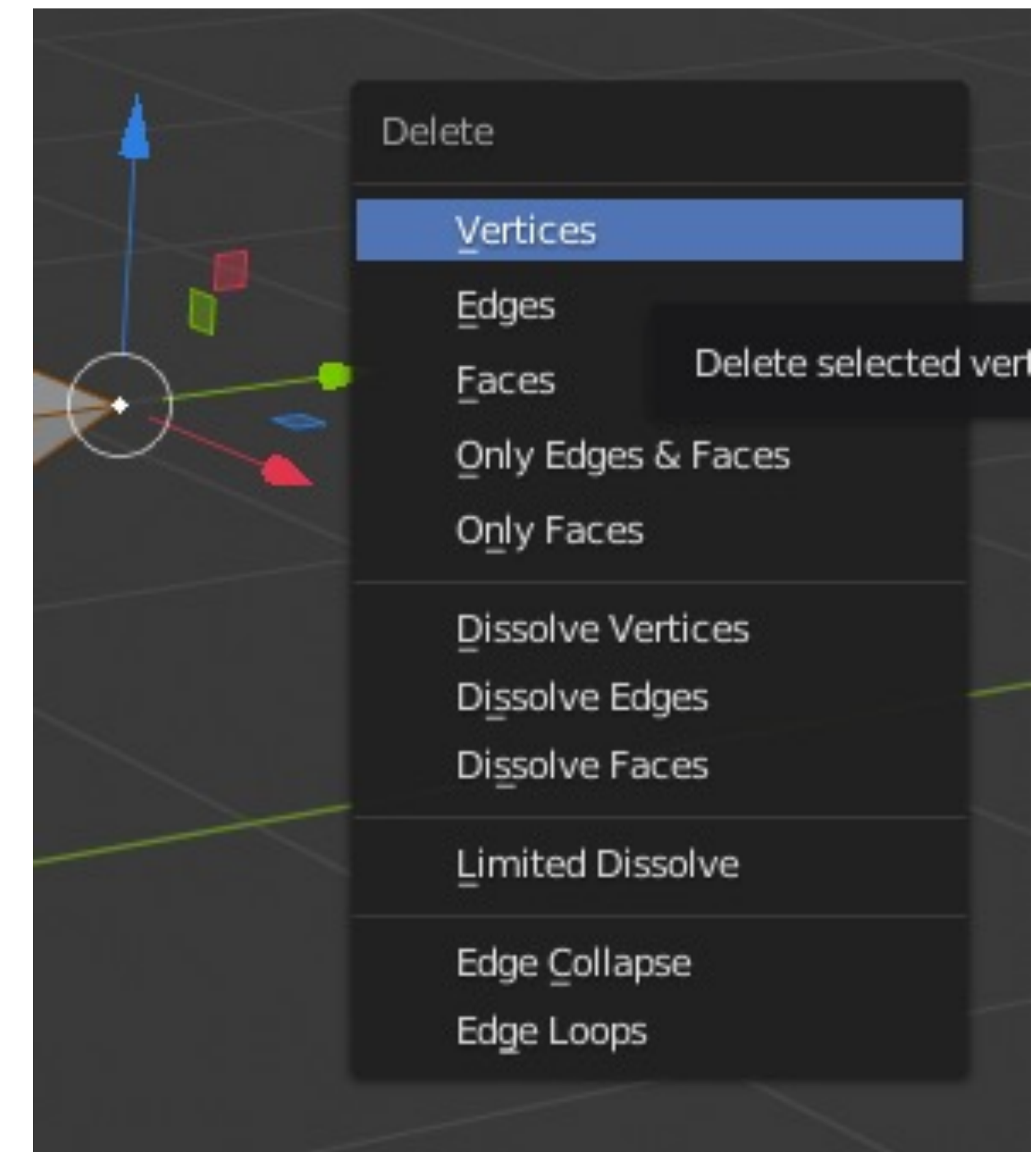
- shortcut –**M**
- merge two or more vertices
- different merging options
 - at first vertex selected
 - at last vertex selected
 - at center of all vertices
 - at cursor location
 - collapse





Delete & dissolve

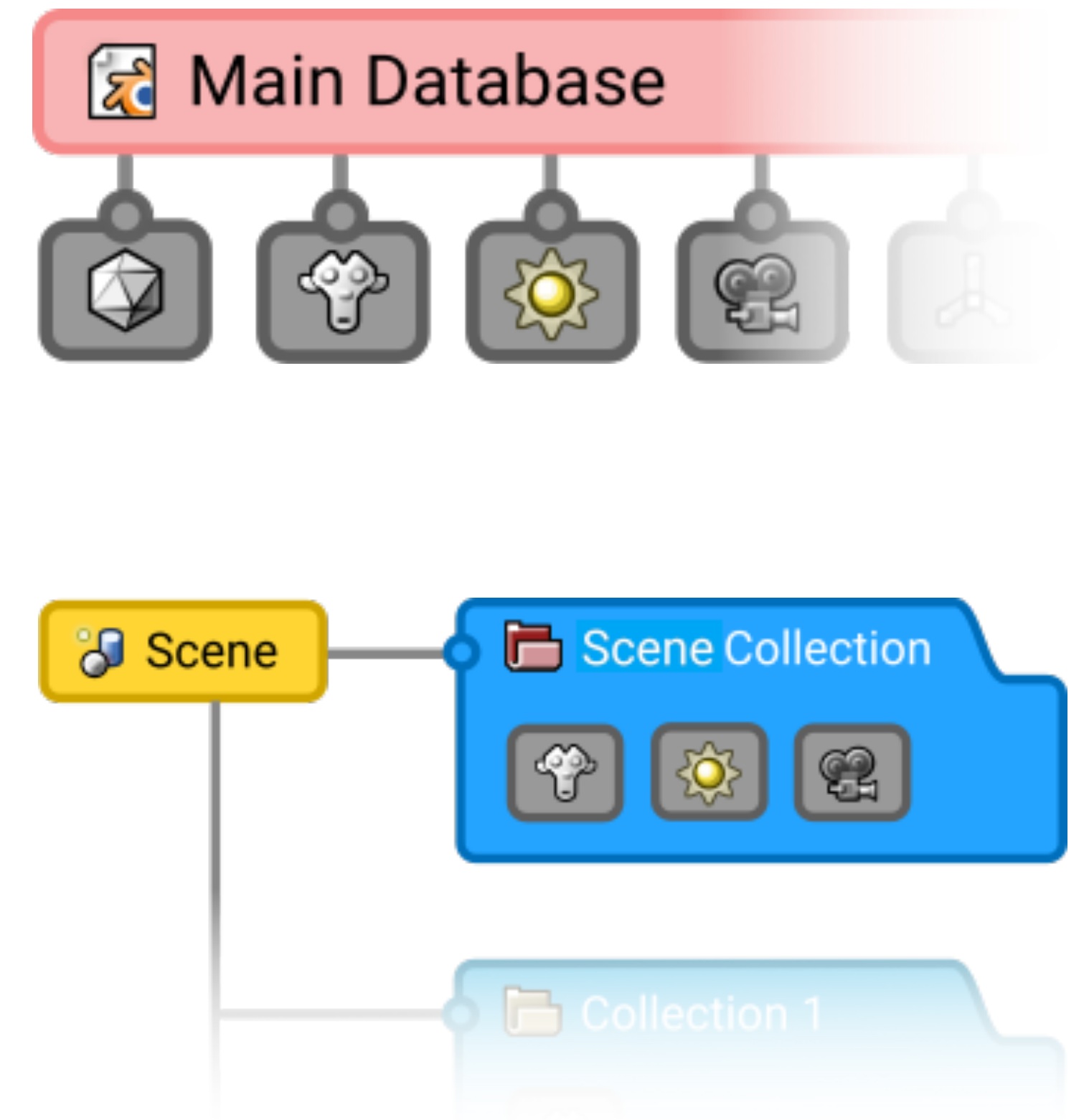
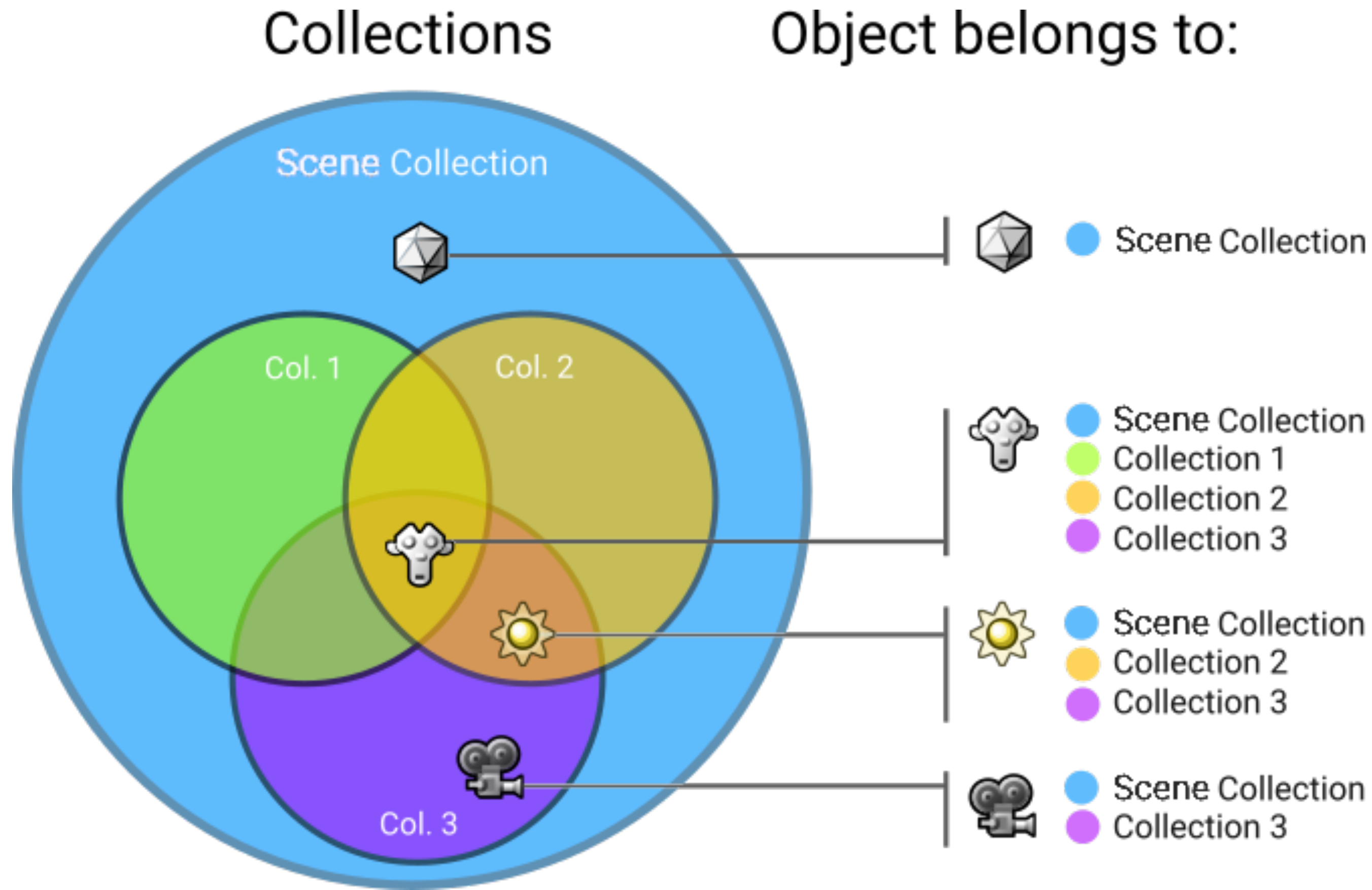
- shortcut – **X**
- to remove components
- DELETE selected vertices/edges/faces
 - can be limited to whichever geometry is preferred
 - leaves holes in geometry
- DISSOLVE removes selected geometry and fills in surrounding geometry





Multiple selection

- *useful once there's a complex model*
- **ALT + (mouse click)** => select edge loop
- **SHIFT + (mouse click)** => select multiples with mouse
- **CTRL + + / -** => additionally select neighboring geometry
- **A** => select all
- **ALT + A** => deselect all
- **B + (drag mouse)** => select all geometry inside drawn square
- **C + (drag mouse)** => select all geometry inside circle
- **CTRL + (drag mouse)** => select all geometry inside drawn loop



organization



Organization is important!

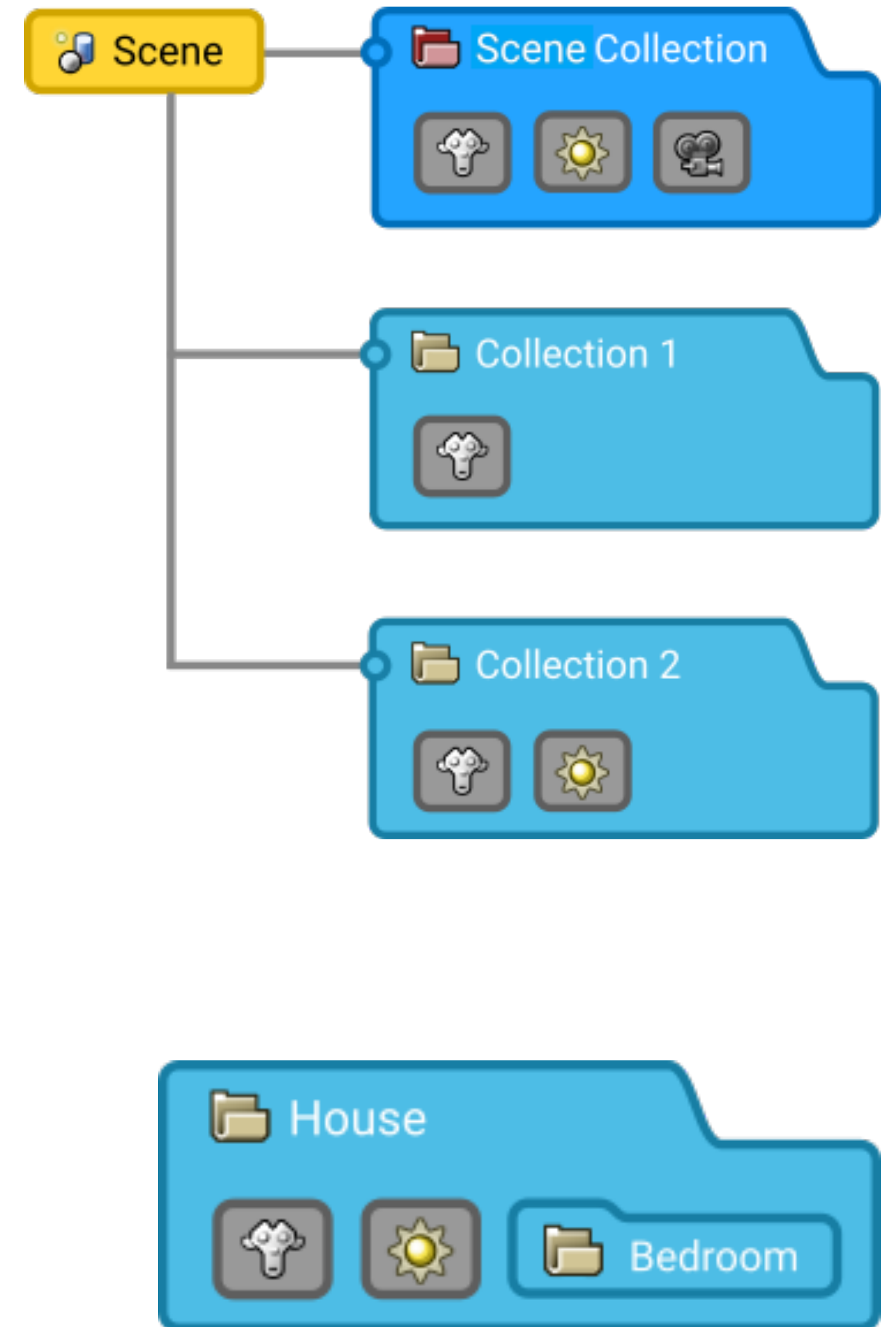
- renaming objects
 - meshes
 - bones
 - vertex groups
 - animation sequences
 - ...
- making folders (collections)

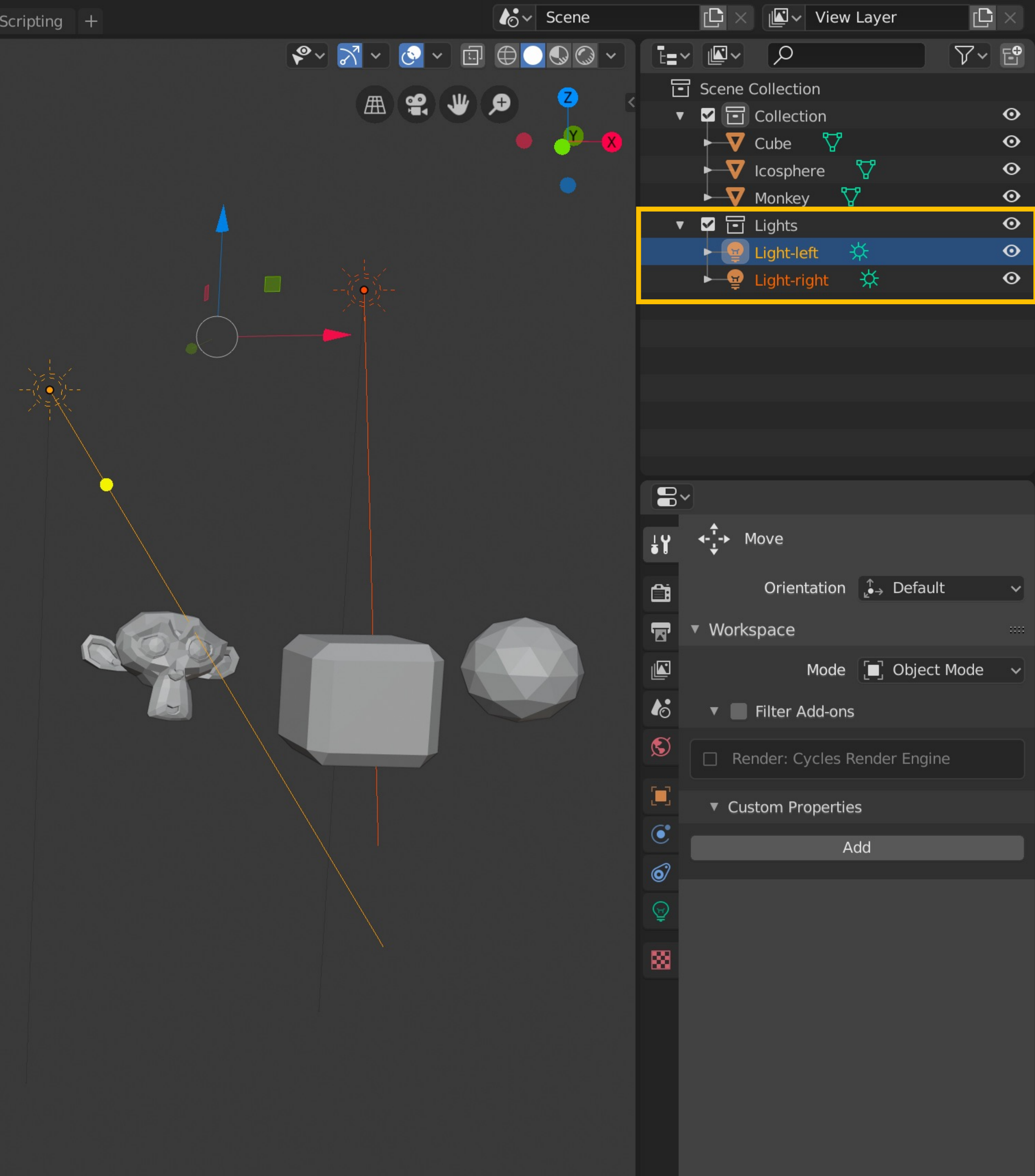


Collections

- make your own collections
- better organization
- result is a clear and flexible way to arrange objects

- named and sorted hierarchically
- nested collections



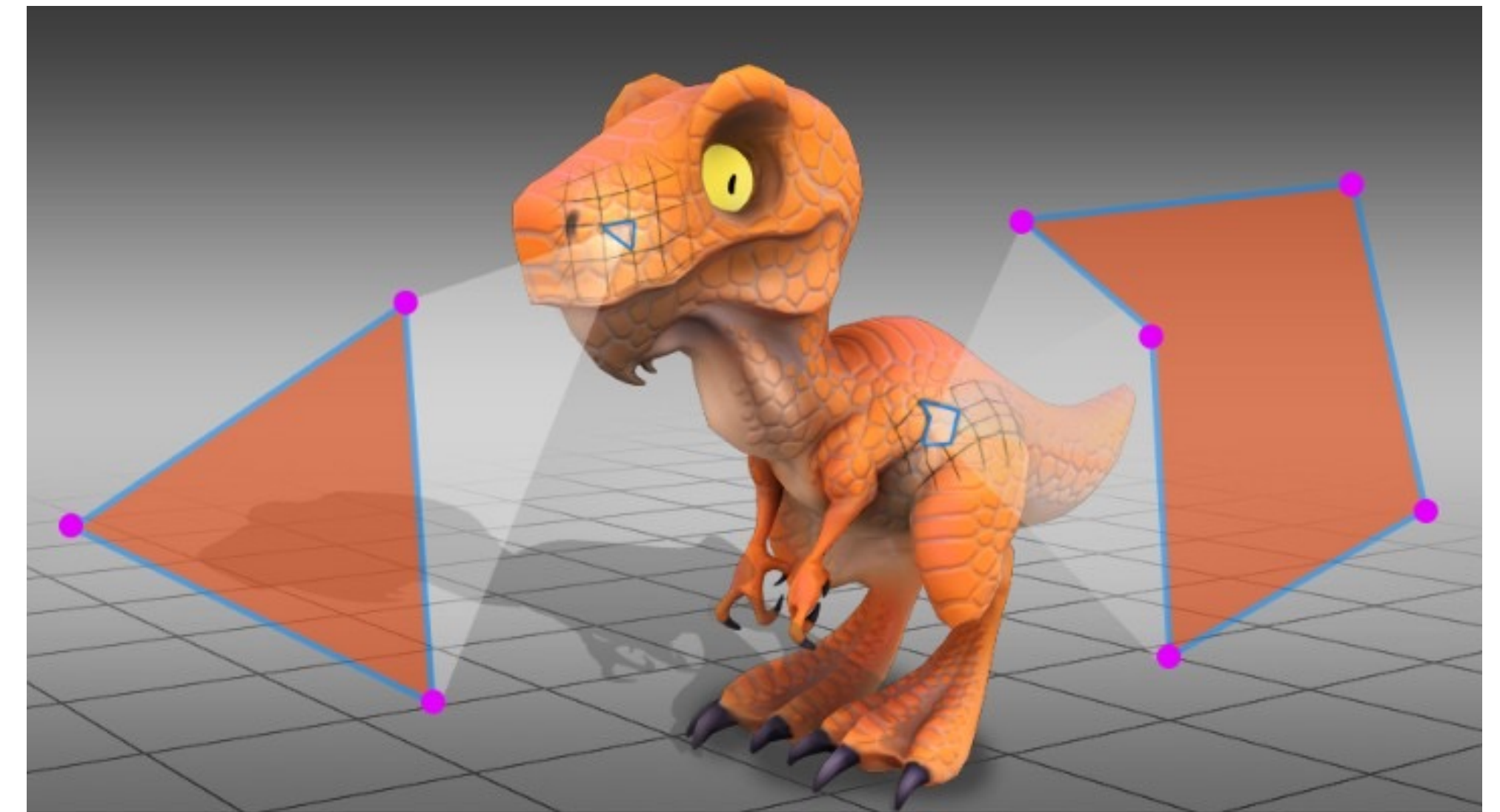


Adding collections

- select objects in scene which you want to group together
- shortcut – **M**
- new collection => name collection
- add to existing collection

How to approach 3D modeling?

- modeling for static images or objects
- modeling for animation

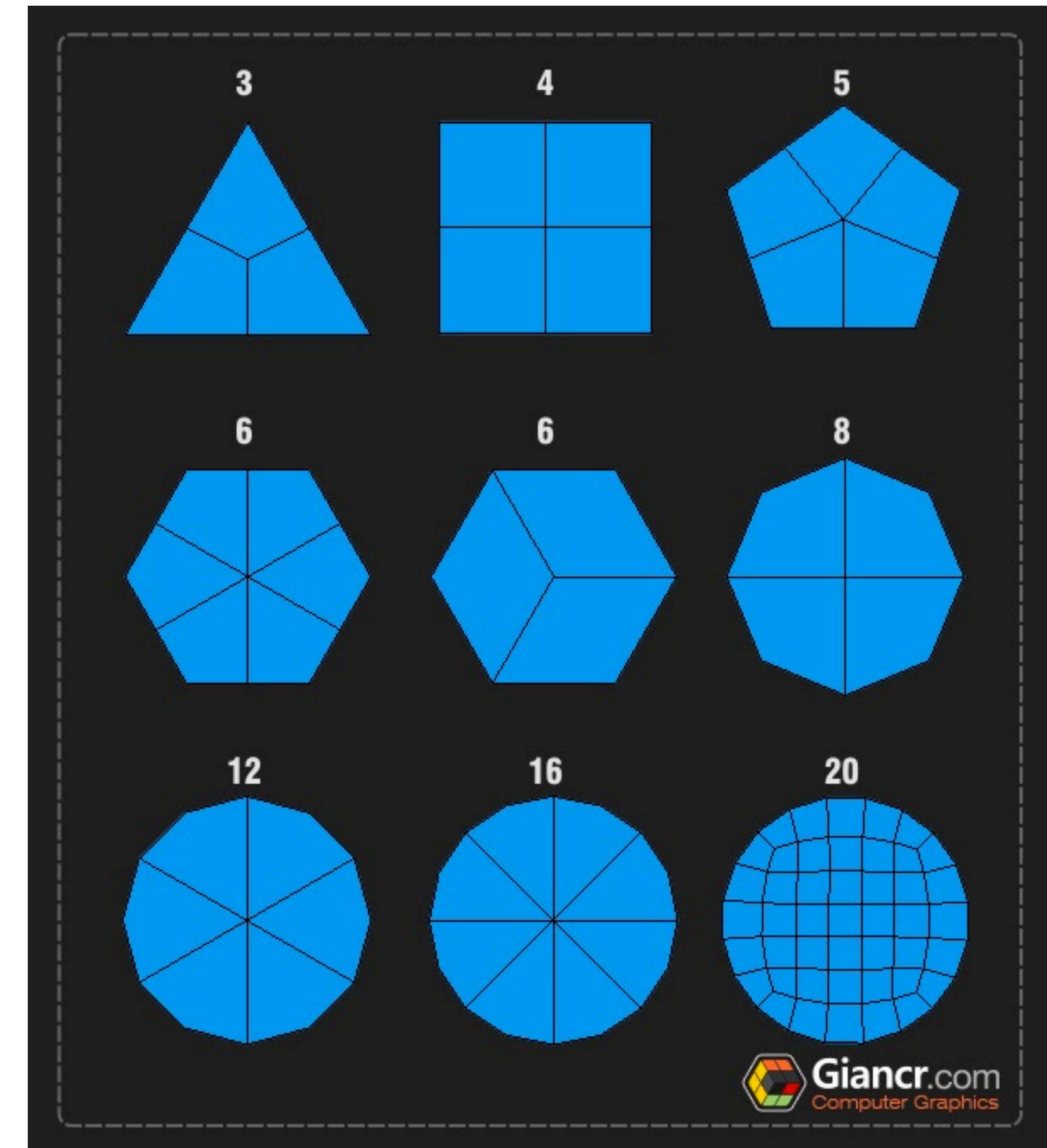


- **quad is better than tris or N-gon**
 - tris => face that consists of just 3 vertices
 - quad => face that consists of 4 vertices
 - N-gon => polygon made up of five or more vertices



Why quads?

- behave better than any triangles or n-gons
- usage of tools
- usage of modifiers (*especially subsurf*)
- deforming the polygon mesh during animation
- render problems



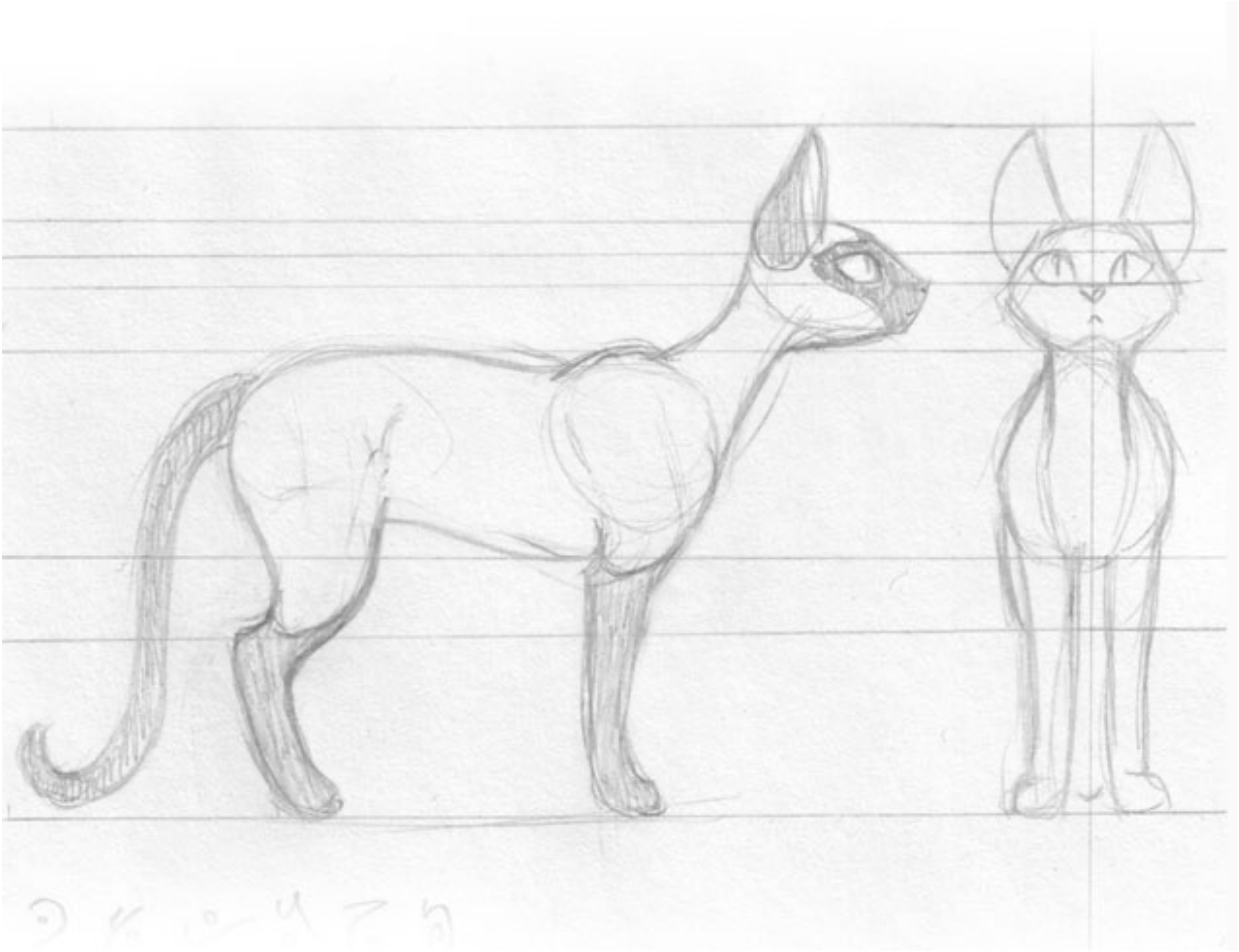


From idea to 3D model





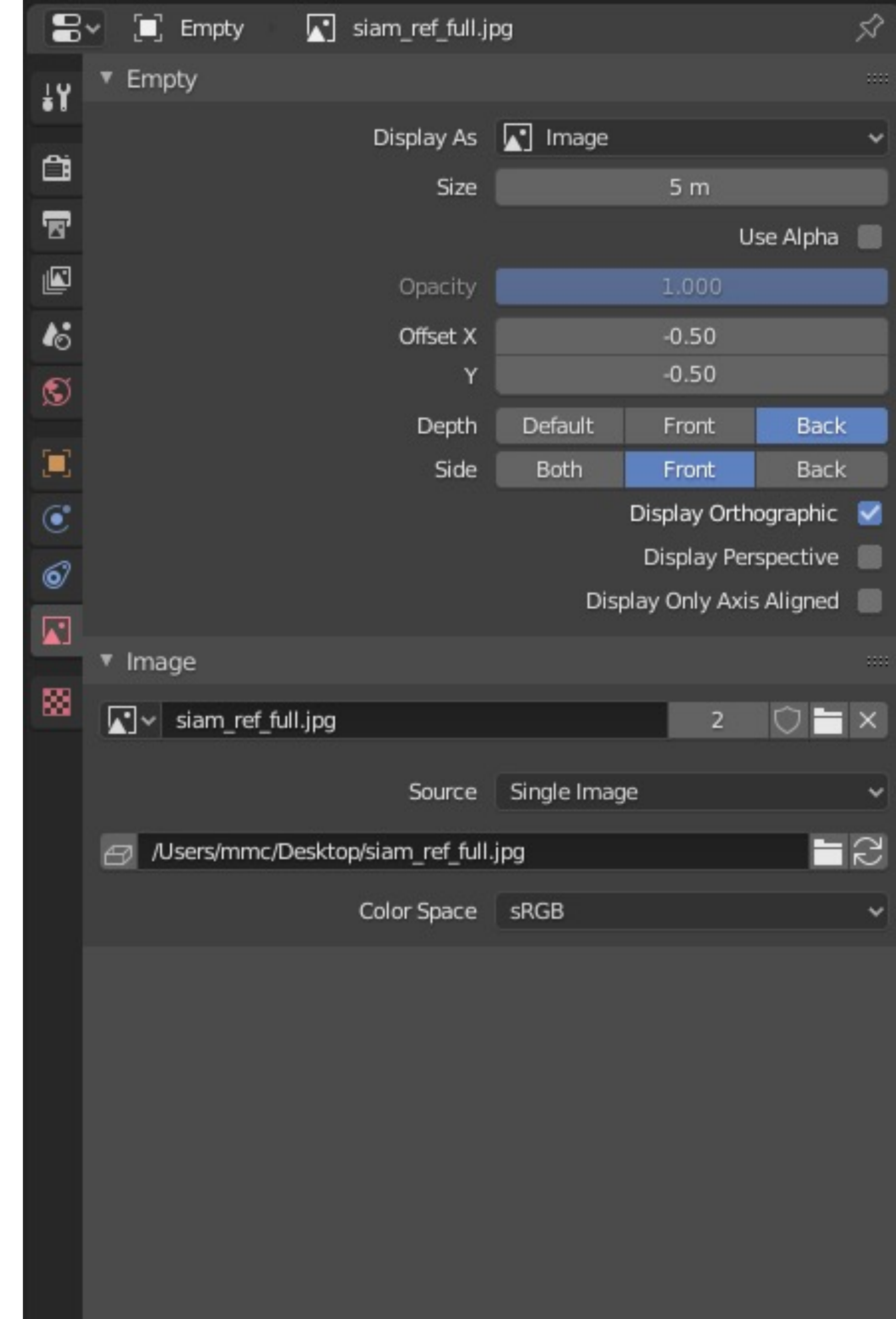
From reference image to 3D model





Reference images

- help you create 3D models
- right proportions
- **shift+A > image > background** to add new reference image
- add to front view (1) and side view (3)





3D model creation

- pick what you want to make *and find some reference images of it*
- create the basic outline without any details
- add loop cuts for additional geometry
- add details and small shapes

mmc@lmmfe.org

in case you have any additional questions 😊

THANK YOU!