



2. Basics of 3D Modeling: I. Object Mode

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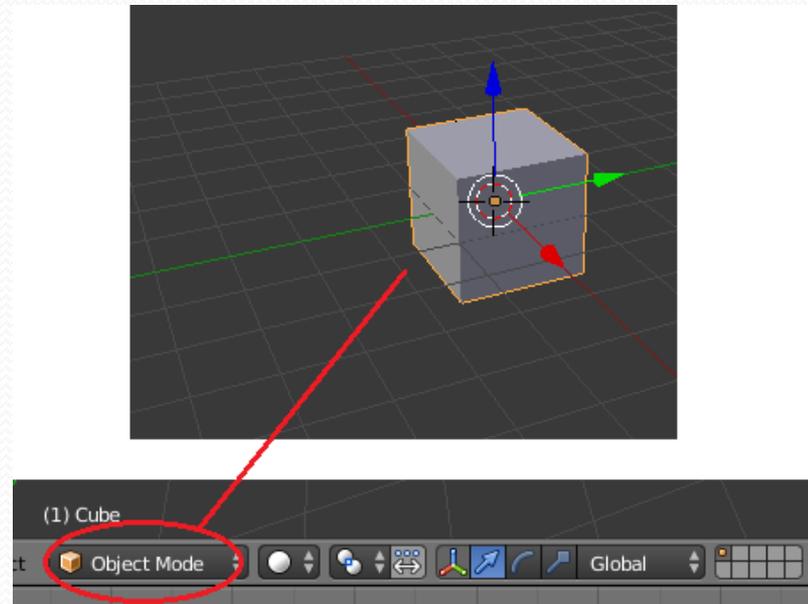
Outline

I. Object mode

- II. Edit mode
- III. Modifiers
- IV. Sculpting system
- V. Curves, surfaces, freeform modeling
- VI. Meta objects
- VII. Background image
- VIII. Procedural Description and physical simulation
- IX. Photogrammetry and Image based Modeling
- X. High and low polygon modeling

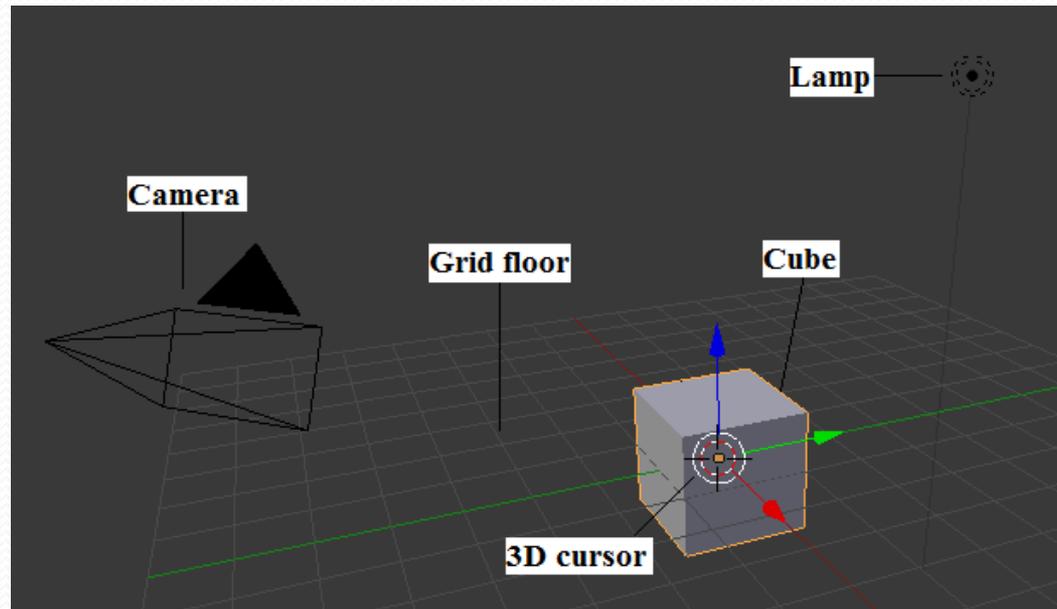
I. Object mode

- Object mode: It allows **working with objects** and their properties,
it is used while :
 - Changing **object settings**,
 - Adjusting **camera angles**,
 - Adding/modifying **lights**,
 - Working with **materials**.



I. Object mode

- Object: item designed for a single or series of specific tasks
- Default Objects:
 - **Mesh**: Building blocks of the scene including cube, circle, and sphere
 - **Camera**: The camera is the eyes
 - **Lamp**: Lamps light the scene



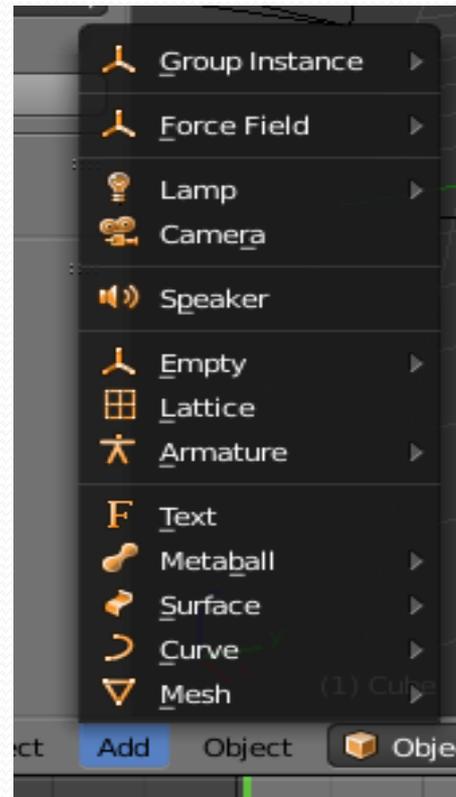
I. Object mode

- Object types:
 - **Curve**: are the equivalent of vector objects in Photoshop / Illustrator
 - **Surface**: falls in the same category as curves
 - **Metaball**: acts much like Mercury in the real world
 - **Text**
 - **Armature**: Armatures are like human skeletons
 - **Lattice**: Gives the ability to deform objects without deforming the actual mesh structure
 - **Empty**: Empty acts as reference object
 - **Force Field**: Affect physics simulations
 - **Group Instance**: used when linking a group of objects from another Blender file

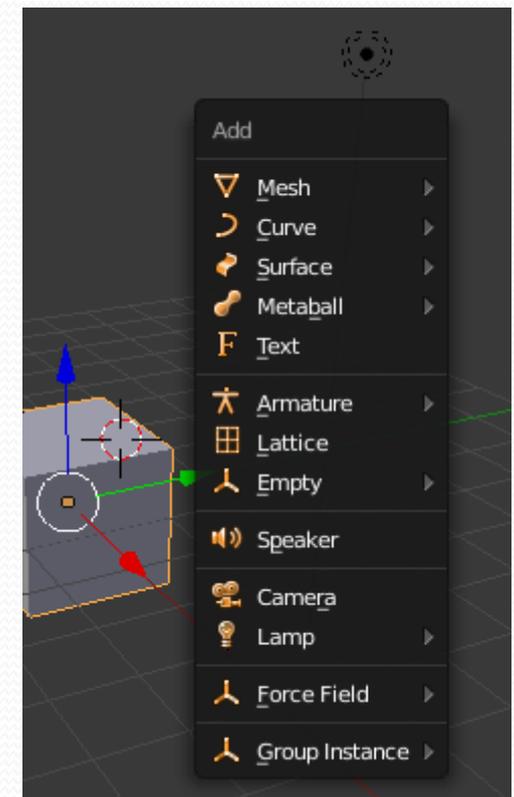
I. Object mode

➤ Adding objects

- Clicking with your **Left Mouse Button (LMB)** on the **Add menu** from the Viewport header (1)
- Clicking **Shift+A** on your keyboard while hovering your mouse over the Viewport (2)



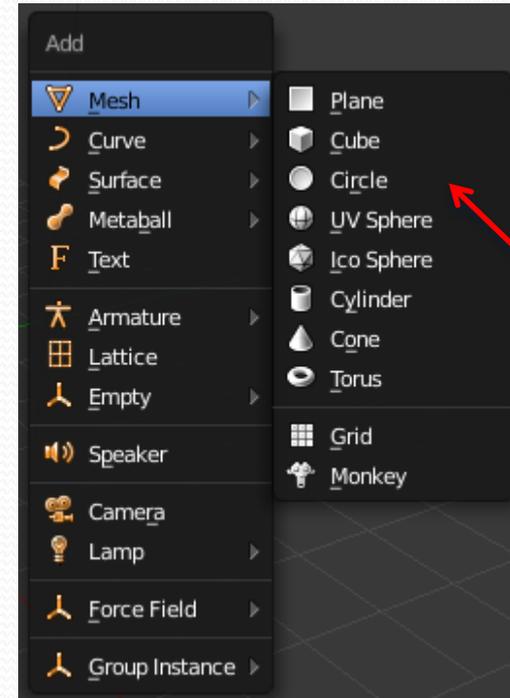
(1)



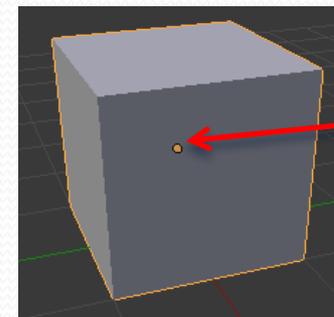
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I. Object mode

- **Primitives** : default shapes that objects can be created in.
- Each object has an **origin point** (center).
- Object **Centers can be moved** to different positions (T Key):
 - **Geometry to Origin**: Move model to origin
 - **Origin to Geometry**: Move origin to the center of the object
 - **Origin to 3D Cursor**: Move origin of the model to the place of the 3D cursor
 - **Origin to Center of Mass**: Move origin to calculated center of mass of model



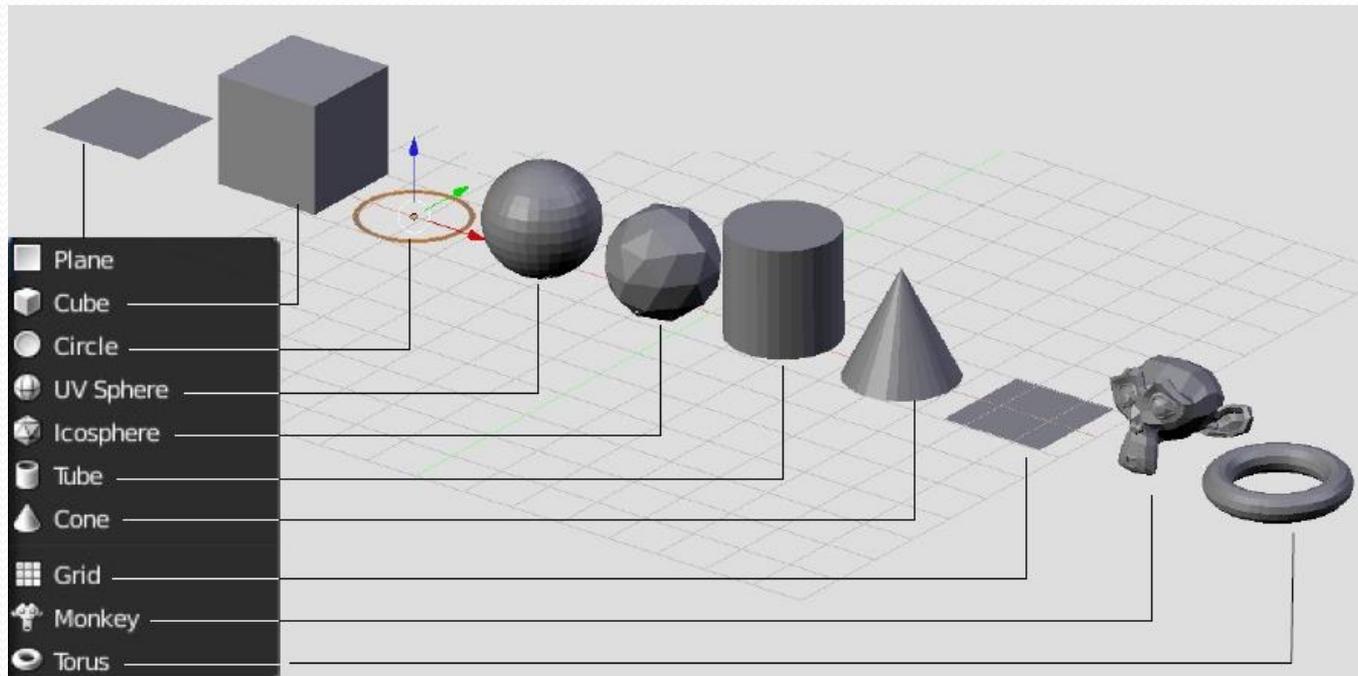
Primitives



Origin point

I. Object mode

- **Mesh types** : There are many types of meshes in Blender



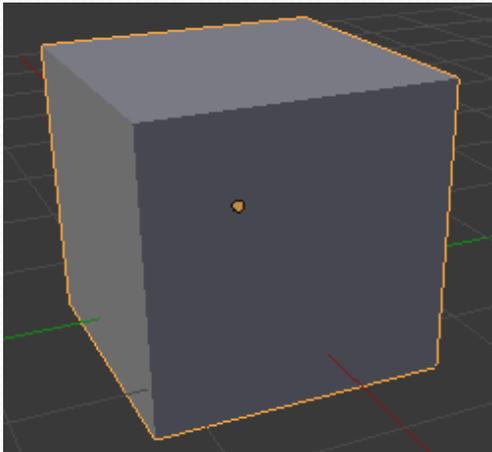
I. Object mode

- Object selecting and manipulating
 - **Right-click**: click on the object with the Right Mouse Button (RMB)
 - **Multiple selection/Remove object from selection**: click on **Shift+RMB** on the object
 - **Box select**: using **B Key**, which allows to click and drag with the LMB (left mouse button) to draw a box around the objects to select
 - **Lasso select**: hold and drag with **Ctrl+LMB** and draw around the selection
 - **Outliner**: click on the name objects with the LMB. To select multiple objects or to deselect an object, use **Shift+LMB**.
 - **Circle Select**: using **C Key**, is used by moving with dotted circle through objects with LMB . You can select any object by touching of circle area.

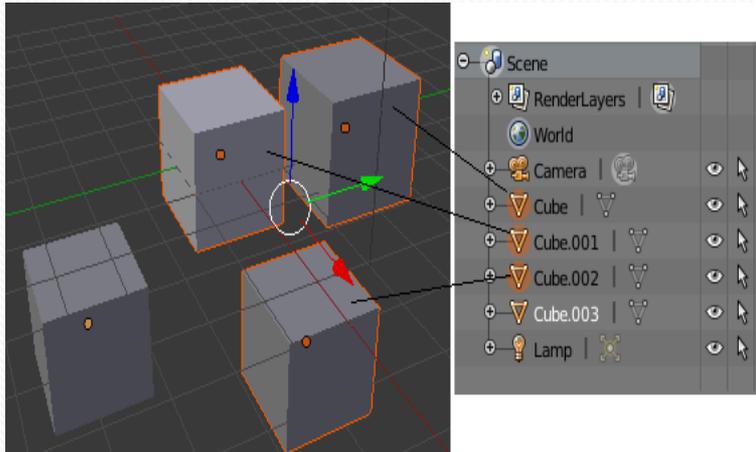
Activity

- **Activity 2.1** : Experiment the following selection mode using some cubes (10 min)
 - Right-click
 - Multiple selection/Remove object from selection
 - Box select
 - Lasso select
 - Outliner
 - Circle Select

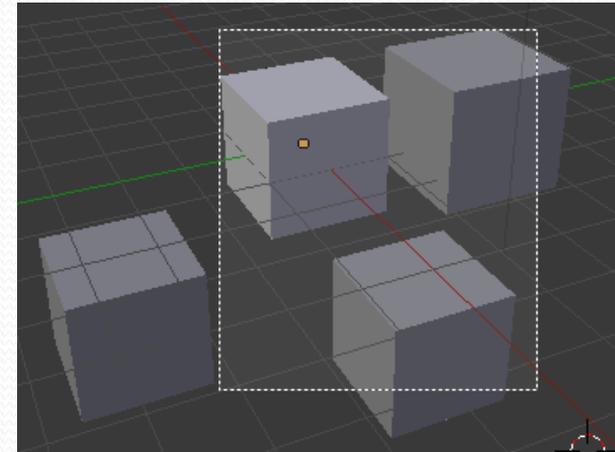
Solution



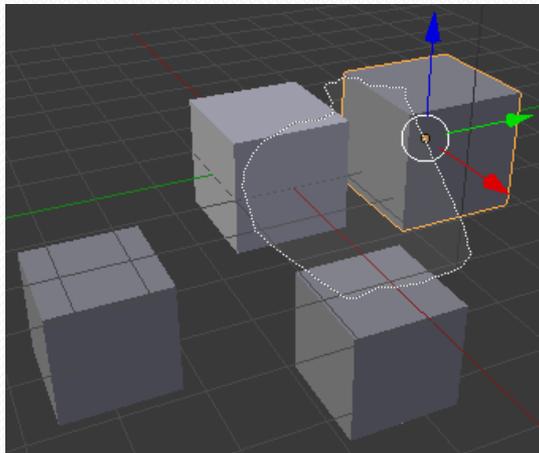
Right click



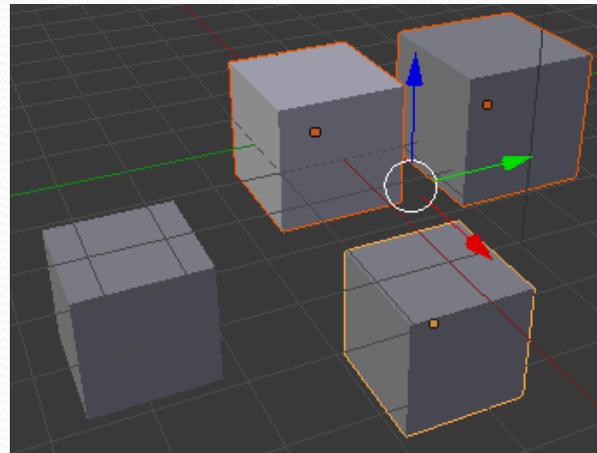
Outliner



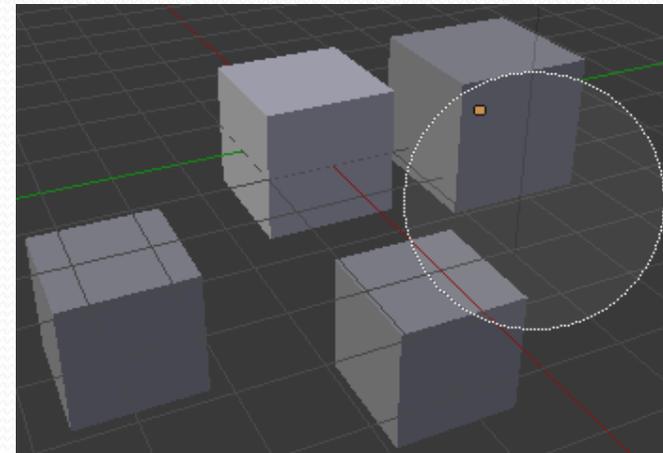
Box select



Lasso select



Multiple select



Circle select

I. Object mode

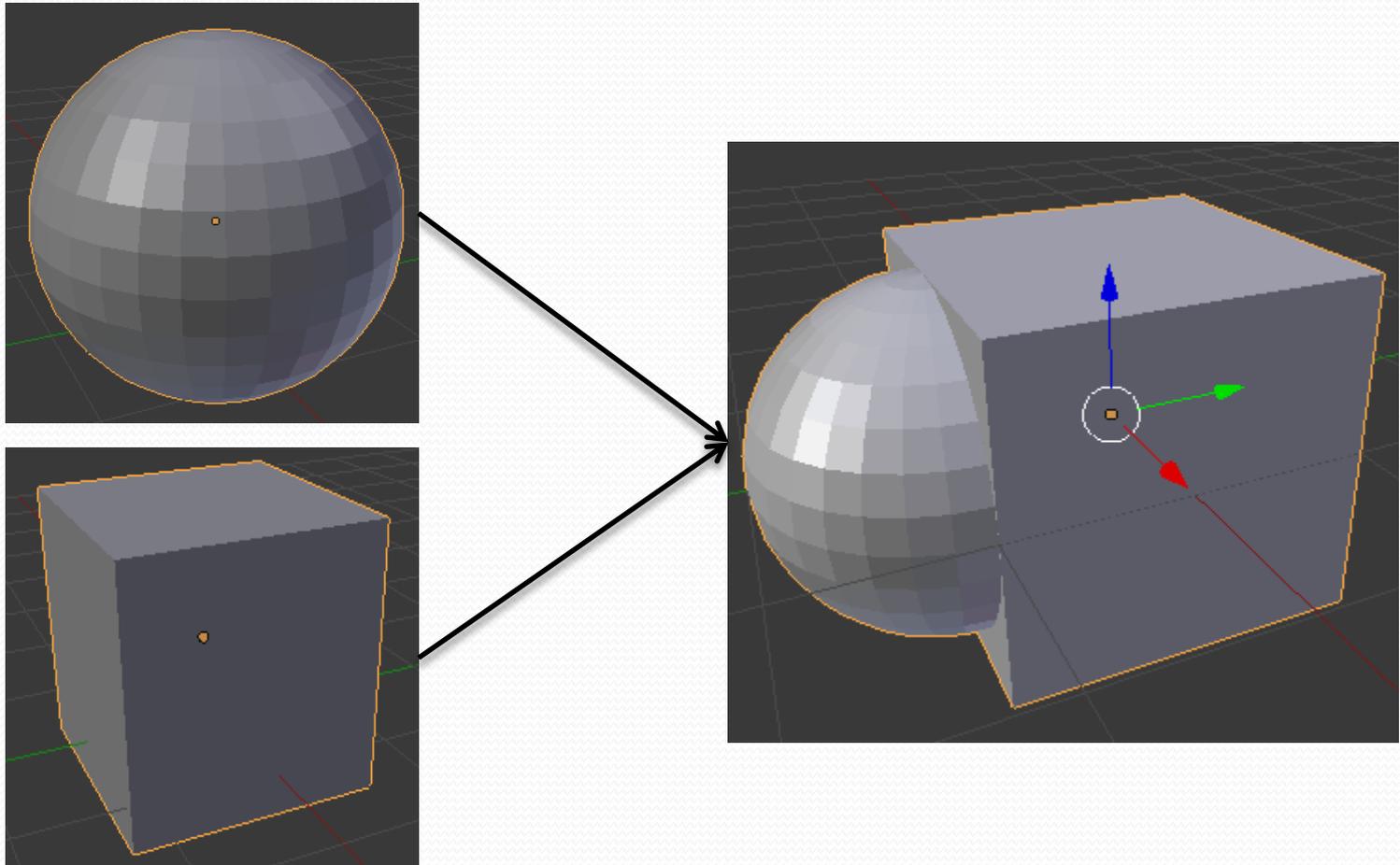
- Duplicating, Deleting and joining Objects
 - **Duplicate**: click the Duplicate button on the Object Tools panel, or press **Shift+D** on your keyboard
 - **Duplicate linked**: creates a new object with all of its data linked to the original object. Click Duplicate Linked on the Object Tools panel or press alt+D
 - **Delete**: click Delete from the Object Tools panel, or press **X** and then LMB/Enter to confirm the action
 - **Join**: Hold down the Shift key to select objects, then press **Ctrl+J** Key to join them or click Join from the Object Tools panel



Activity

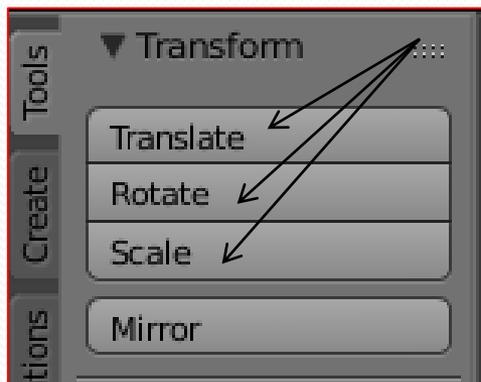
- **Activity 2.2:** Experiment duplicating, deleting and joining meshes (5 min)
 - Use some primitives and apply duplicate, duplicate linked, delete and join options

Solution

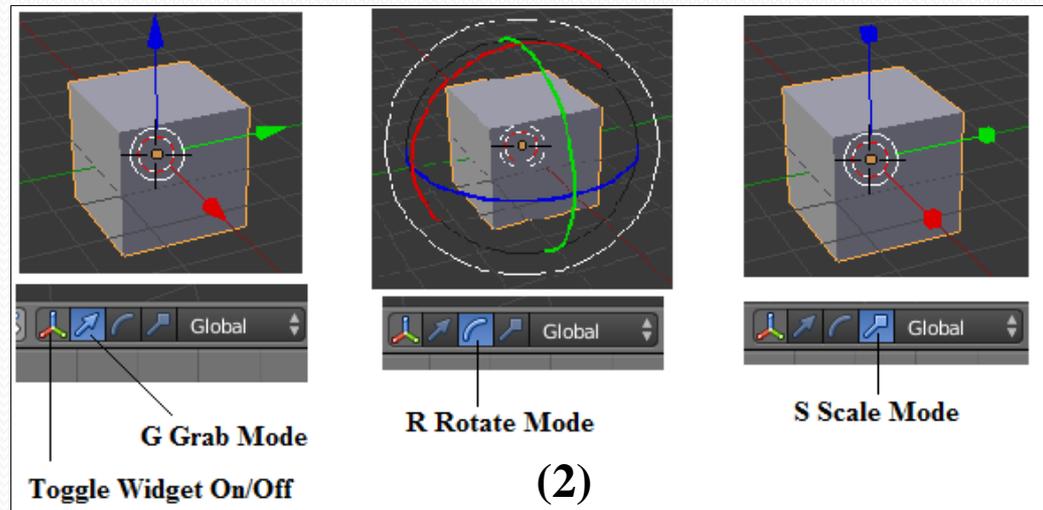


I. Object mode

- Translating, Rotating, and Scaling Objects
 - **Translate**: click Translate from the Object Tools panel, shown in (1), or press **G** on your keyboard, or use grab mode (2).
 - **Rotate**: click Rotate from the Object Tools panel, shown (1), or press **R** on your keyboard or use rotate mode (2).
 - **Scale**: click Scale from the Object Tools panel, shown in (1), or press **S** on your keyboard, or use scale mode (2).



(1)



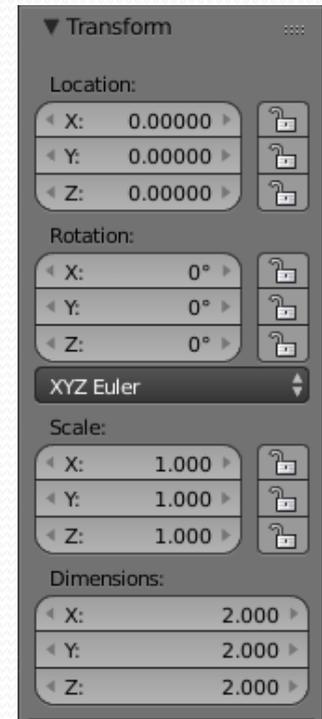
Activity

- **Activity 2.3:** Experiment translating, rotating and scaling meshes (5 min)
 - Use some primitives and apply translate, rotate and scale options

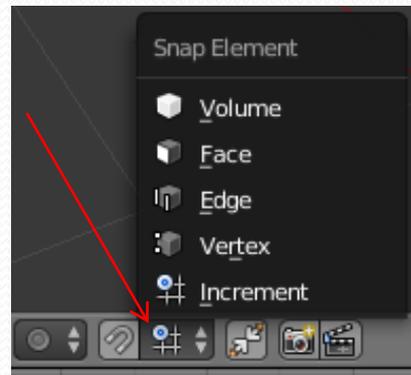
I. Object mode

- Precision Transformation

- **Numerical:** Viewport properties (N Key), under the Transform section, there are fields for Location, Rotation, Scale, and Dimension (1)
- **Specific axis:** press X, Y, or Z keys on your keyboard to lock the transformation to that specific axis.
- **Snapping:** possible snapping objects to a specified parameter, such as other objects, vertices, edges, faces by holding down the Ctrl key. Change the snapping type via the button and menu in (2).

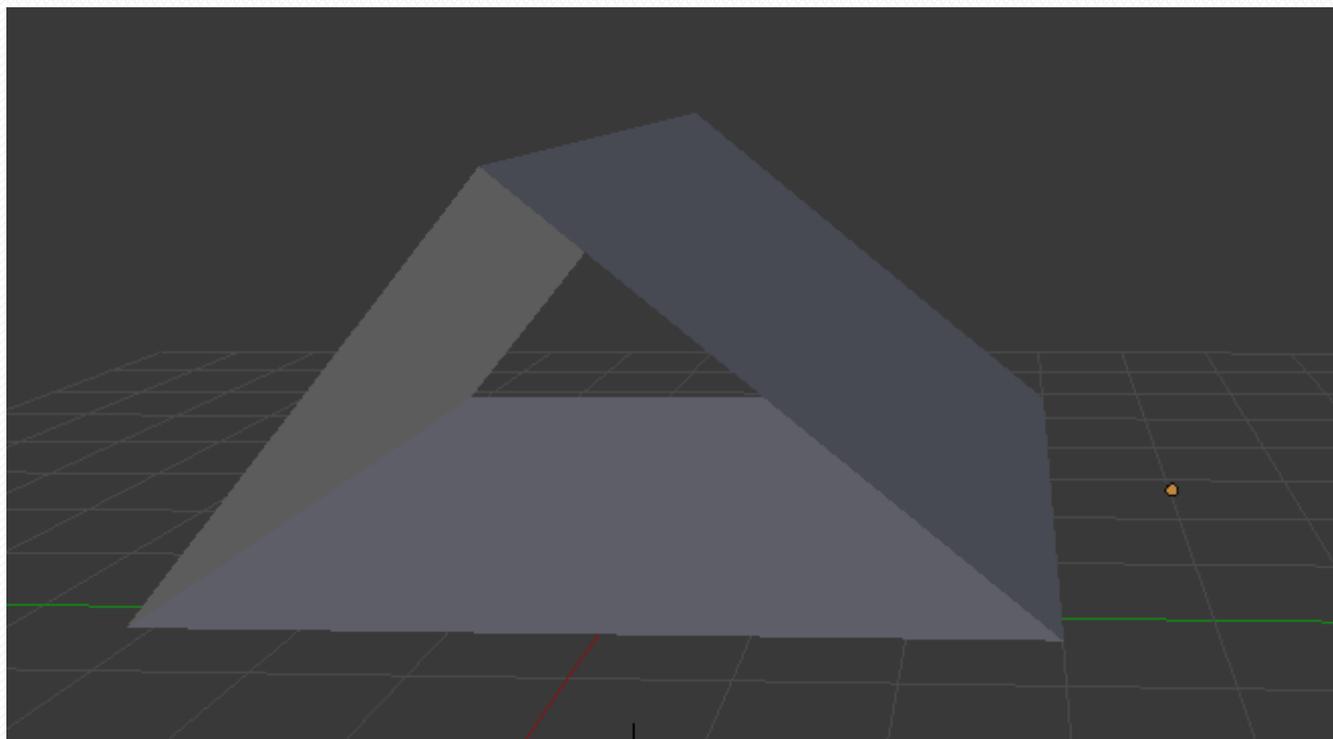


(1)

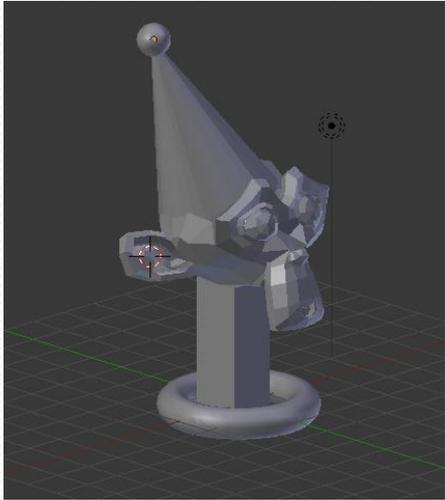


(2)

➤ Snapping edges example:



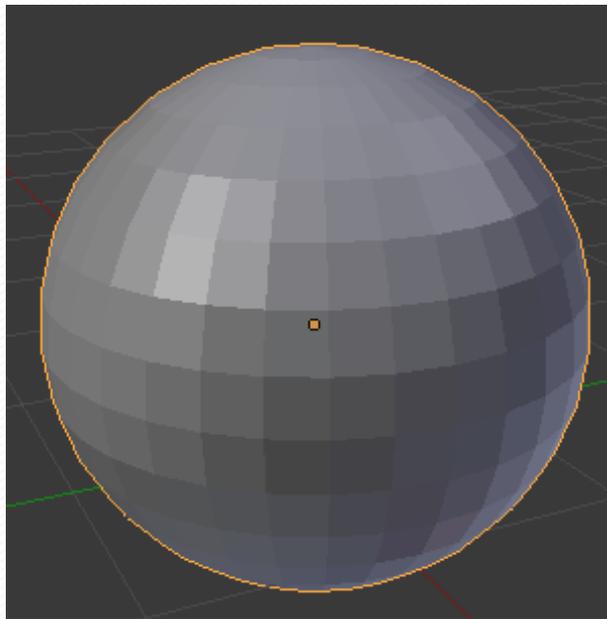
Activity

Activity 2.4	Title: Model a monkey object
Type:	Individual activity- Lab exercise
Goal:	Manipulate some Blender primitives in object mode ILO P1
Outline:	Use some Blender primitive objects and arrange them to look something like the following image 
Timeline	30 minutes
Assessment	Assess the ability of each student to manipulate easily Blender primitives and the basic operations of the object mode

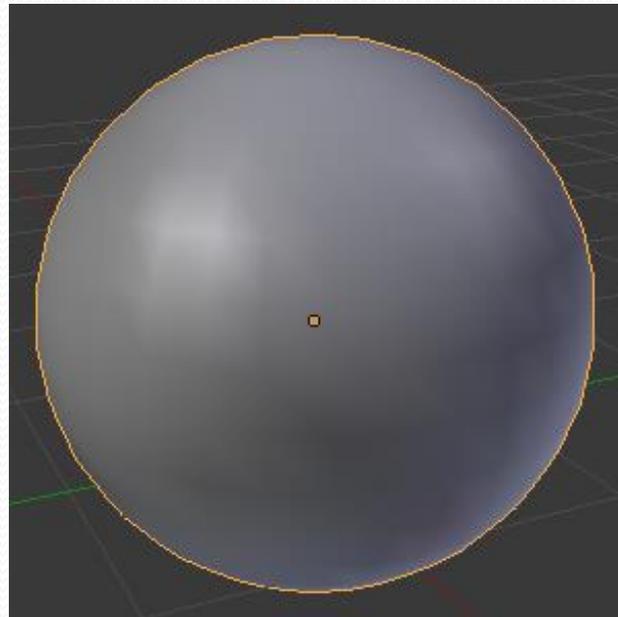
I. Object mode

- Shading Smooth and Flat Options:

Flat



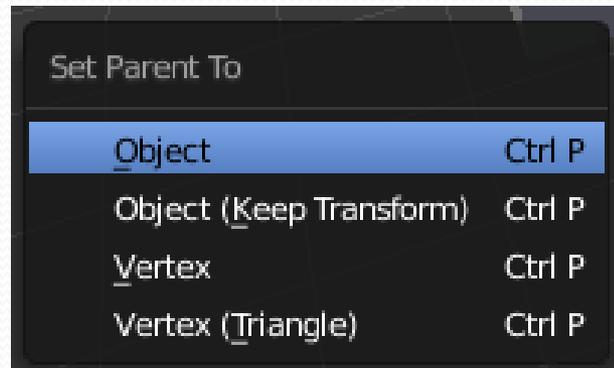
Smooth



I. Object mode

- Grouping And Parenting Objects

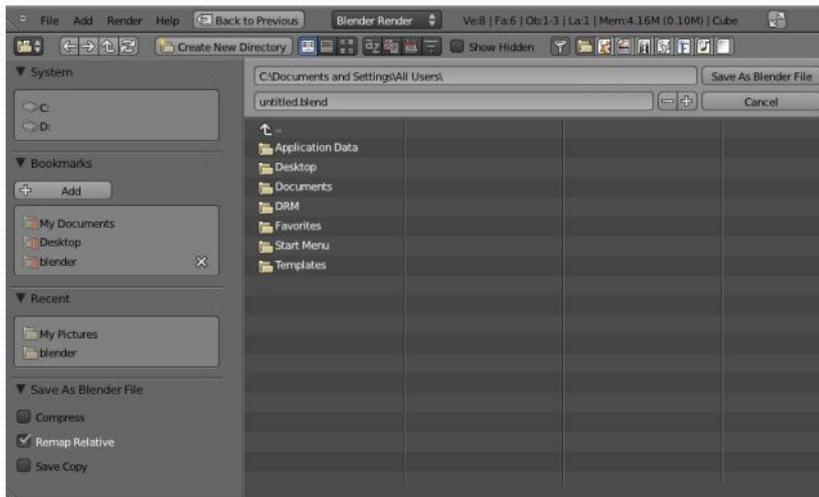
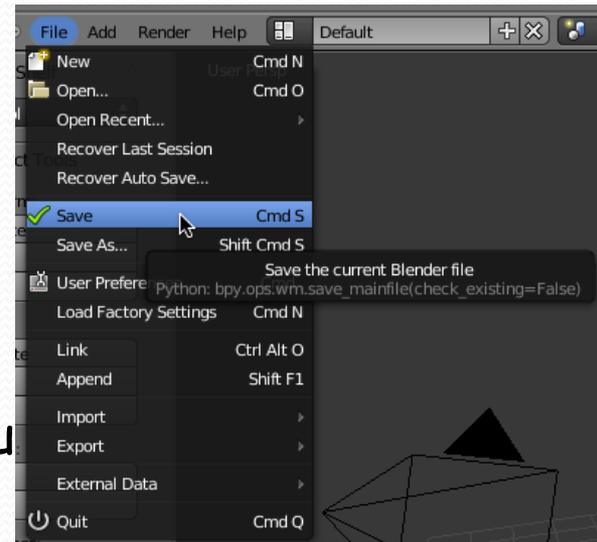
- Select at least two objects and press **Ctrl+P**.
- The last object selected will be the Active Object (outlined in light orange), and will also be the Parent Object. Others will be the Child objects.
- **Any Movement or transformation of the parent also affects the children.**



- Clear Parent: select child-> Alt+P Or object -> parent -> clear parent

Saving

- File - Save
- Save as
- Creating iterated saves
- Recover last session (Help menu)



Activity

Activity 2.5	Title: Use Ten cube for modeling
Type:	Individual activity- Challenge
Goal:	Use low poly modeling to model 3D realistic objects using exactly ten cubes ILOs I1 & P1 & P2
Outline:	Use exactly 10 cubes to model the maximum number of 3D realistic meshes. Cubes can only be directionally stretched with scale (in rectangular directions) or rotated
Timeline	1 hour
Assessment	Assess the number and the quality of meshes proposed by each student