1. 3D modeling concepts, techniques and tools: Introduction to Blender

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Outline

I. 3D computer graphics
II. 3D modeling concepts

III. Introduction to Blender

II. 3D modeling concepts and tools

4. 3D modeling tools

Title	Developped by	License	3D Rendering Support
CINEMA 4D	MAXON Computer	Commercial software	Yes
Maya	Autodesk Media and Entertainment	Commercial software	Yes
LightWave 3D	NewTek	Commercial software	No
3ds Max	Autodesk Media and Entertainment	Commercial software	Yes
Blender	Not a Number Technologies (NaN) and NeoGeo	Free and open-source	Yes

Activity

Activity 1.2	**Title:** Compare some 3D modeling tools
Type:	Group activity – research work
Goal:	Familiarize students to 3D techniques, concepts and tools ILO P1
Outline:	During this activity, students should: • Conduct a bibliographic research about three modeling tools : Blender, Maya and 3ds Max • Compare these tools using the following metrics: – Usability in the 3D industry – Performances – Functionalities – Documentation – … • Prepare a presentation
Timeline	A week
Assessment	Assess the presentation of each group

III. Introduction to Blender

1. Presentation

- 3D computer modeling and animation software
- Written in C, C++ and Phython
  - + Professional, free and open-source
  - + multiplatform (Windows, Linux, Mac OS X…)
  - + Non memory intensive
  - - Not Available in some languages
  - - Difficult to use at the beginning
- Blender's features : 3D modeling, UV unwrapping, texturing, sculpting, animating, rendering…
- Integrated game engine

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2. Blender installation

- Download the appropriate package (Last stable release is the 2.79 version, official website: http://www.blender.org), unpack the compressed file anywhere on your Computer
- Installation requirements

Hardware	Minimum performance	Optimal performance
CPU	32-bit dual core 2Ghz CPU with SSE2 support	64-bit eight core CPU
RAM	2 GB	16 GB
Monitor	24 bits 1280×768 display	Two full HD displays with 24 bit color
Keyboards	Working number pad (optional but recommended)	Working number pad
Graphic card	OpenGL-compatible graphics card with 256 MB RAM	Dual OpenGL-compatible graphics cards, quality brand with 3 GB RAM
Mouse	Mouse or trackpad	Three button mouse and graphics tablet

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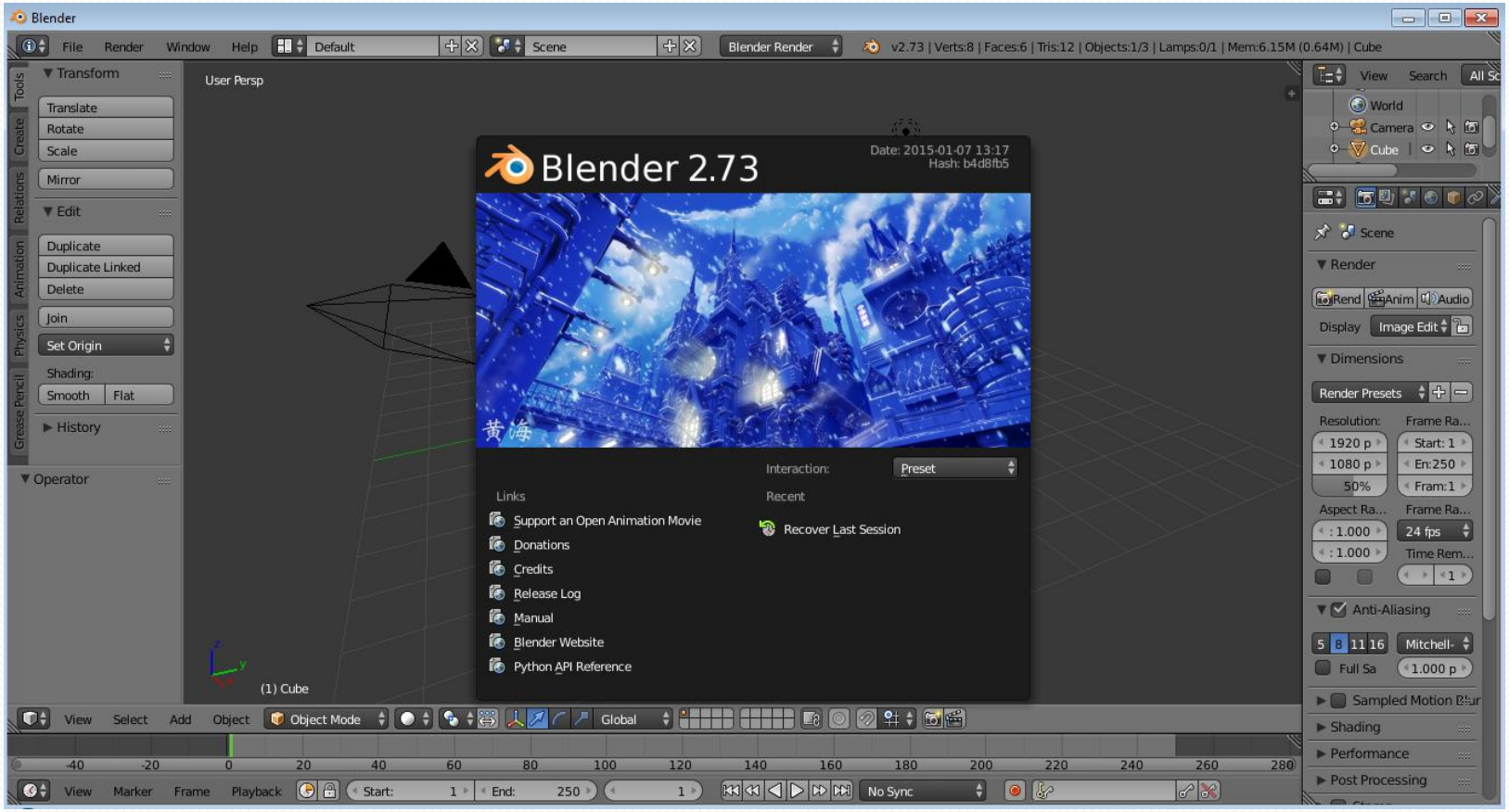
3. Mouse notation

Notation	Action or Button
LMB	click with the Left Mouse Button
MMB	press down on (don't turn) the scroll wheel or Middle Mouse Button
RMB	click with the Right Mouse Button
SCROLL	turn the scroll wheel in either direction

III. Introduction to Blender

4. Blender interface

- Starting Blender



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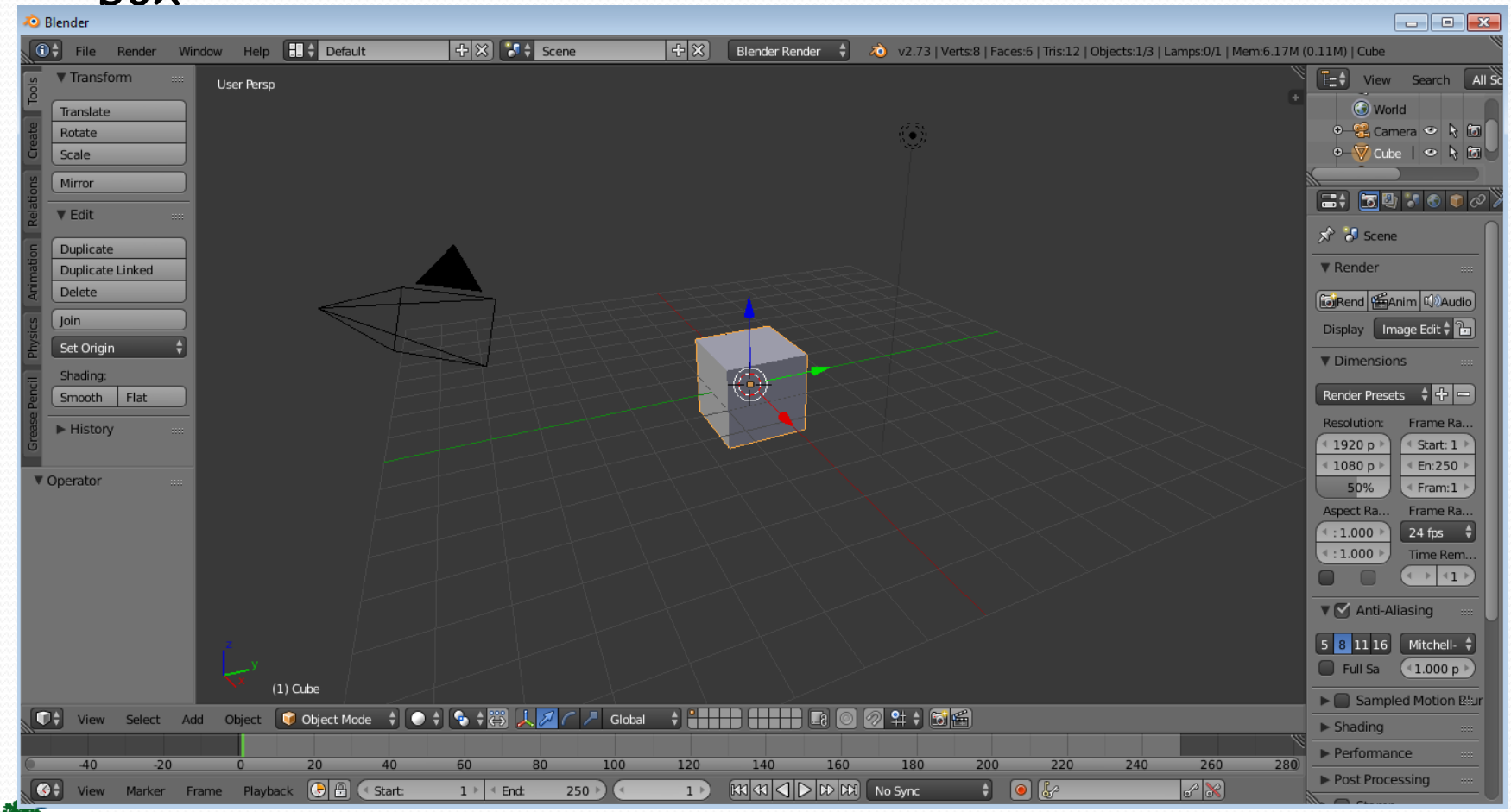
4. Blender interface

- Left Mouse Bottom (LMB)-click to remove the initial title box



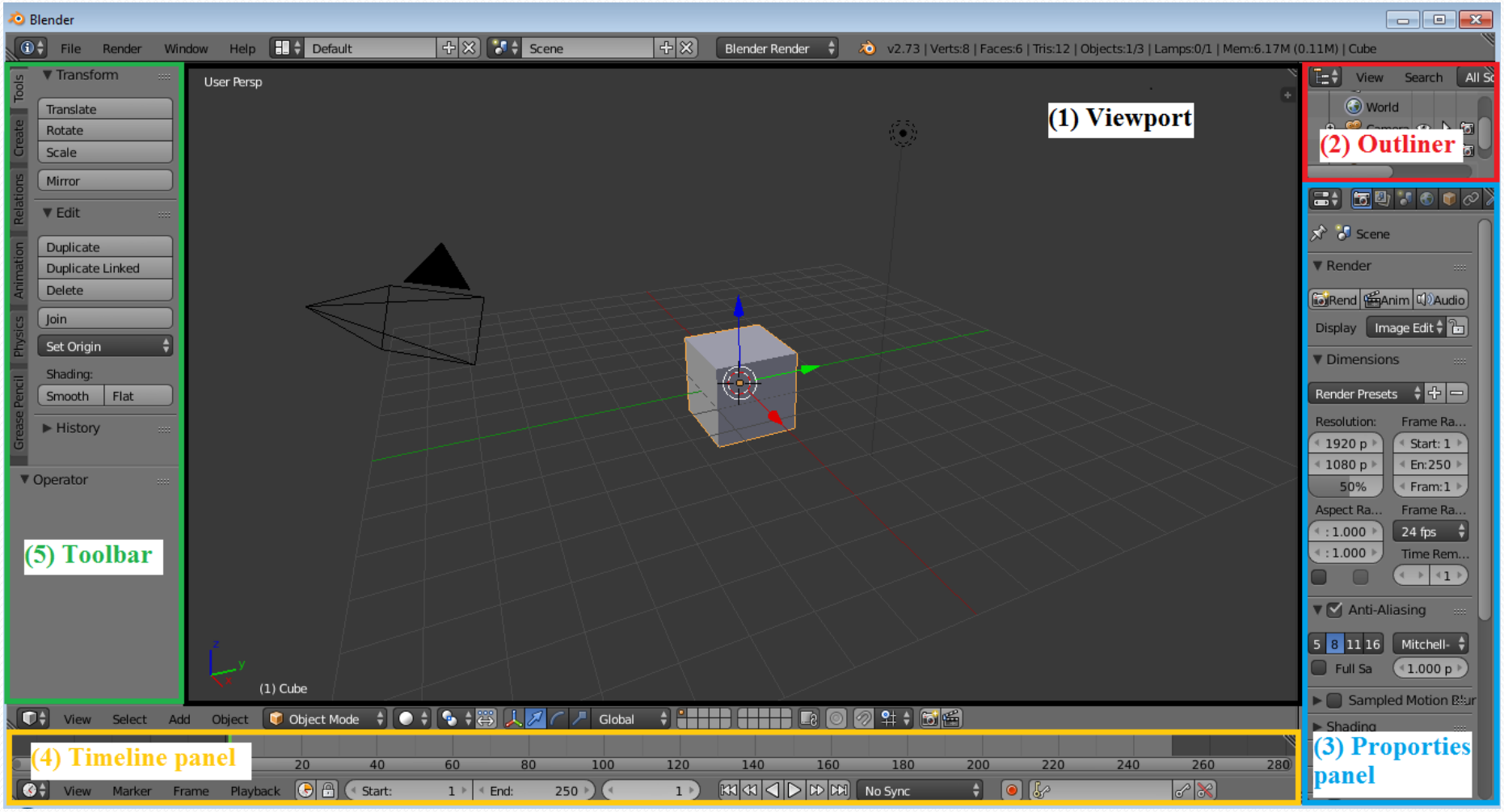
III. Introduction to Blender

4. Blender interface

- Primary elements of Blender's interface:
  - Viewport,
  - Outliner,
  - Properties panel,
  - Timeline panel,
  - Toolbar

III. Introduction to Blender

4. Blender interface



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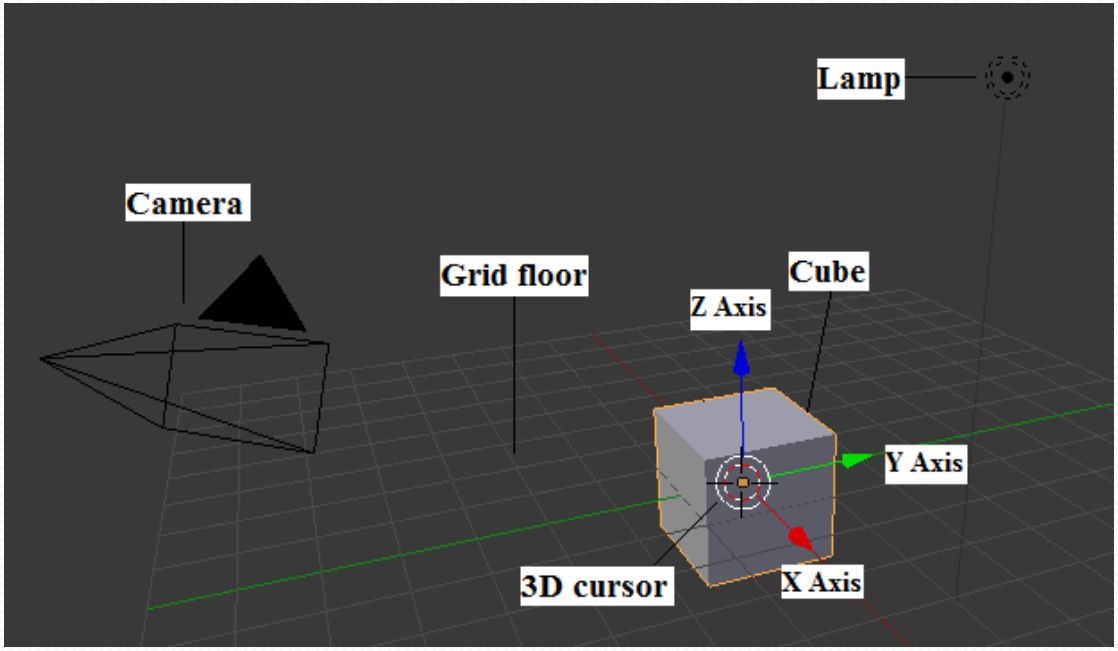
4. Blender interface

- **The viewport**: view into the 3D space (the workspace), contains the following features
  - Grid floor
  - Objects: a mesh, a lamp, and a camera by default
  - 3D cursor



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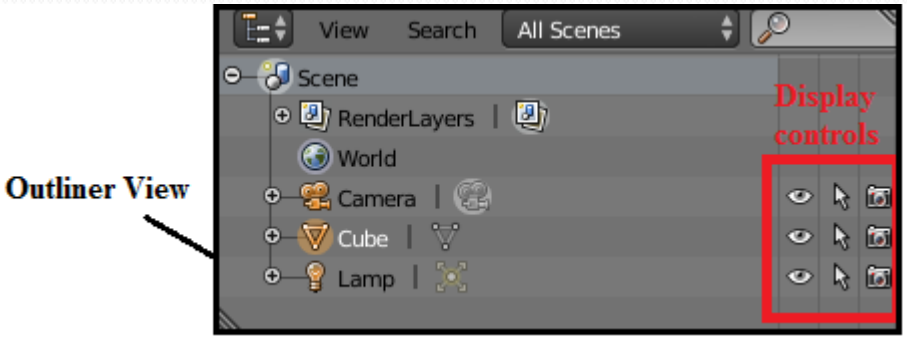
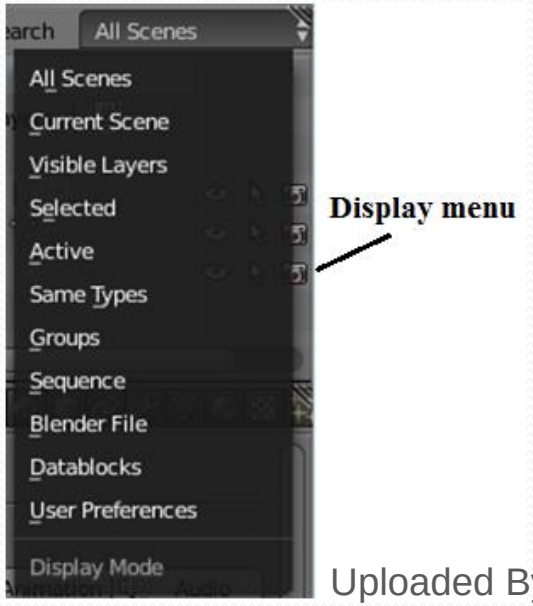
4. Blender interface

- **The Outliner**:
  - Cantains list and names of all objects in the scene
  - Rundown of the scene in hierarchical order
  - Outliner view: list of all of the components in the scene
  - Display controls: toggle an object as visible, selectable, and/or renderable
  - Display menu: set what is displayed in the Outliner view

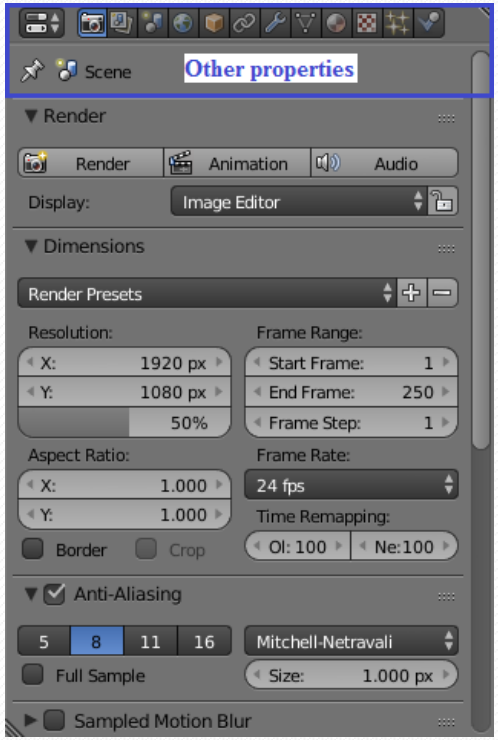




III. Introduction to Blender

4. Blender interface

- **The Properties Panel**: contains the setting of the scene (by default displays the Render properties)
  - Render properties
  - Other properties (Properties panel header): Objects, Modifiers, Shading, and so on



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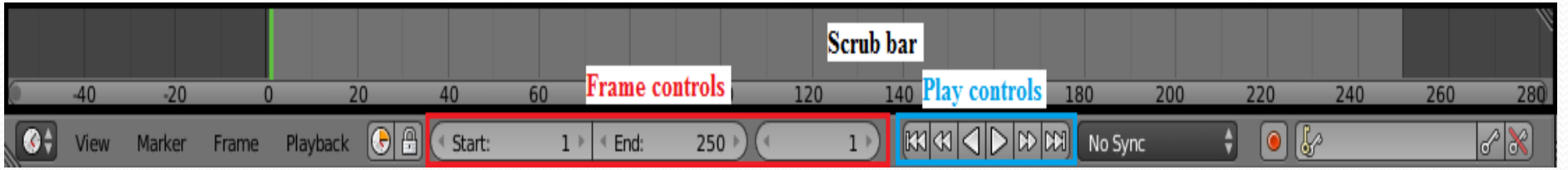
4. Blender interface

- **The Timeline Panel**: time management for animation
  - Scrub bar
  - Frame controls
  - Play controls



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4. Blender interface

- **The Toolbar**: common tools for modeling, rendering and animation
  - Object Tools panel: list of tools pertaining to working with objects
  - Operator panel: displays the most recent operation performed

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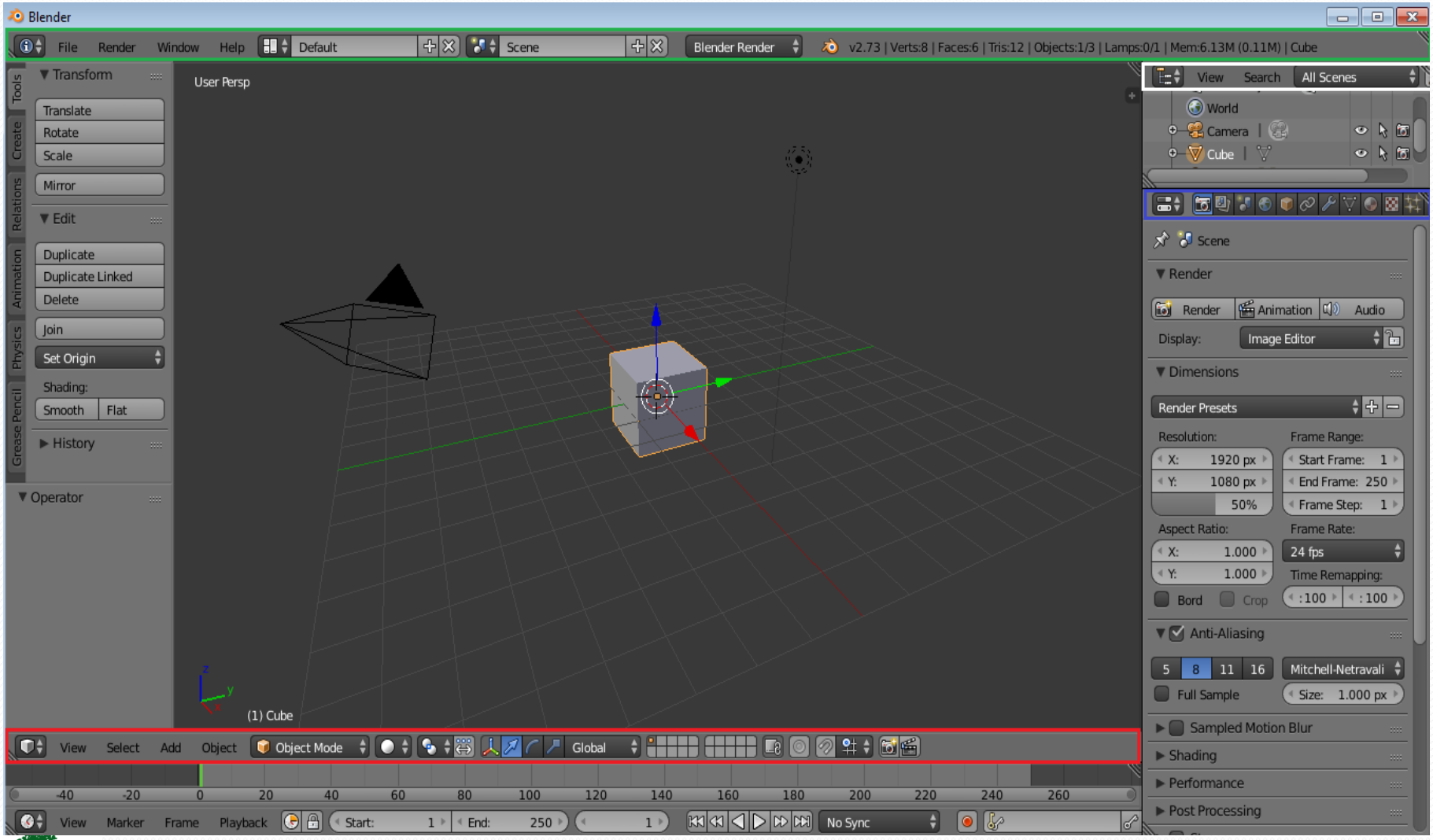
5. Headers



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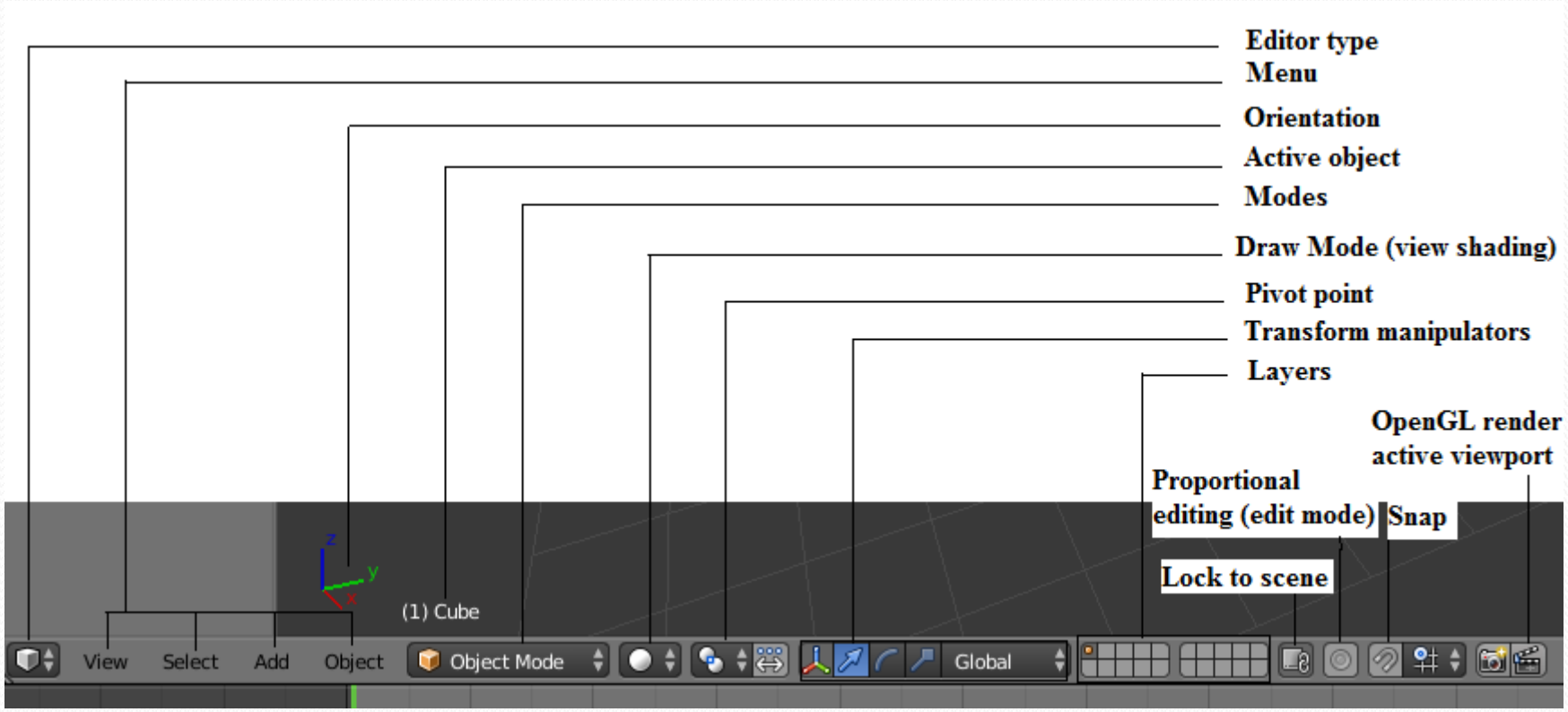
5. Headers

- Viewport header:



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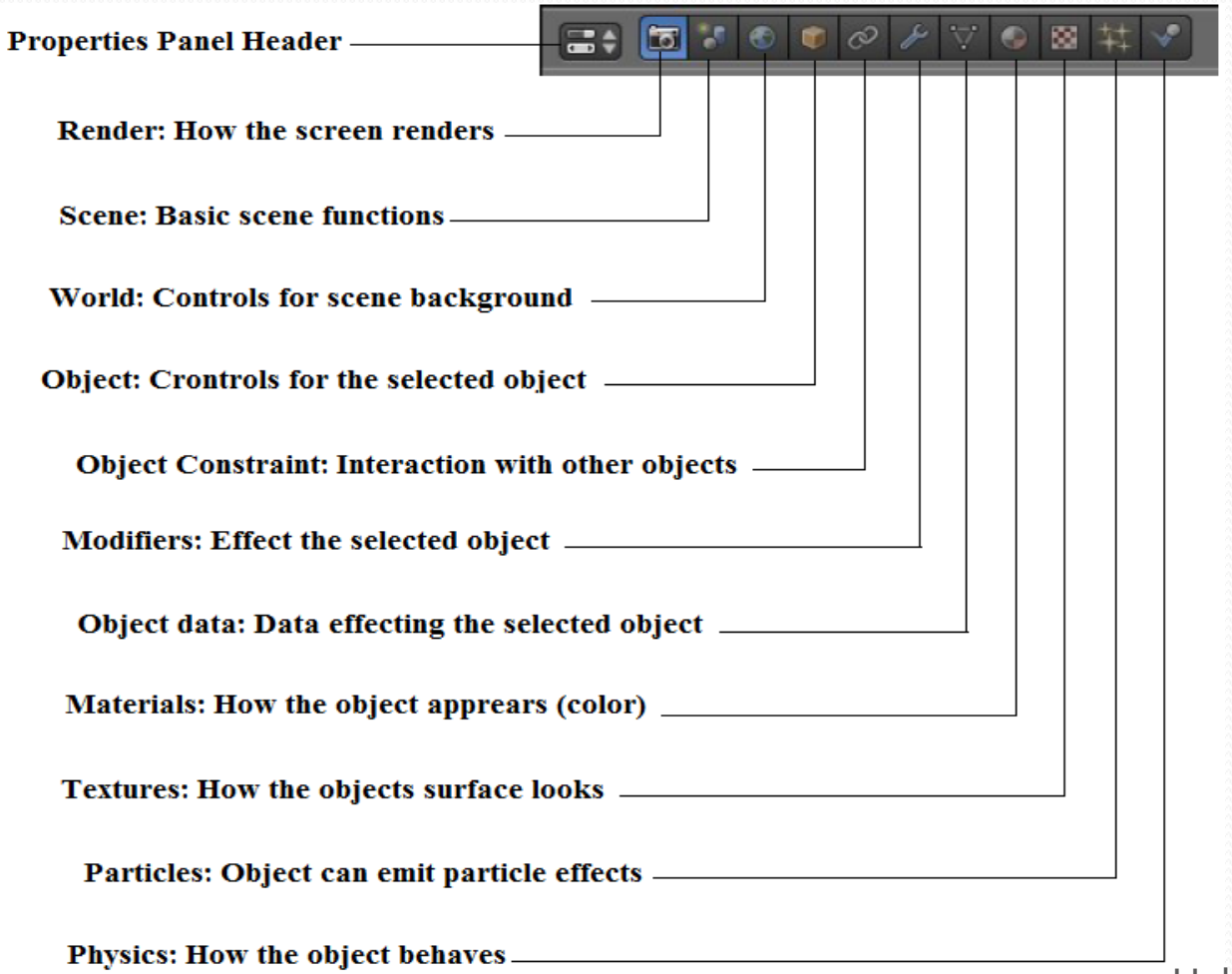
5. Headers

- Properties panel header:



III. Introduction to Blender

6. Navigation in the viewport

- The viewport is the worksapce
  - **Panning**: Shift+Middle Mouse Button (MMB) and moving your mouse.
  - **Rotating**: clicking and holding the MMB while dragging until the desired viewing angle.
  - **Zooming**: using the scroll function of your MMB, or by using the + and/or – keys on the numeric keypad., or by using Ctrl+MMB.

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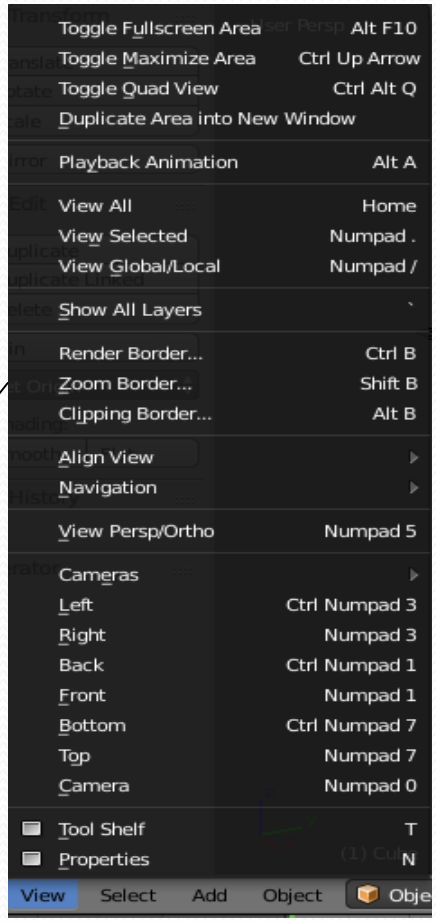
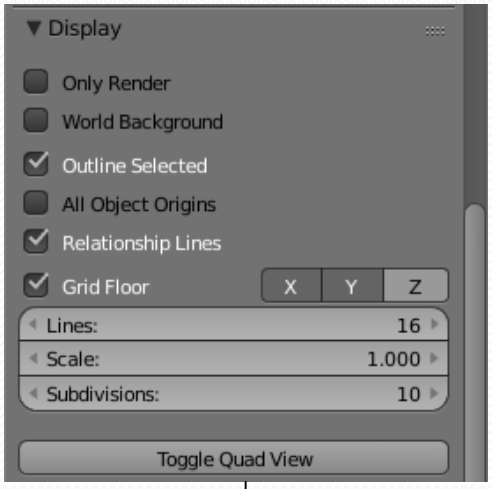
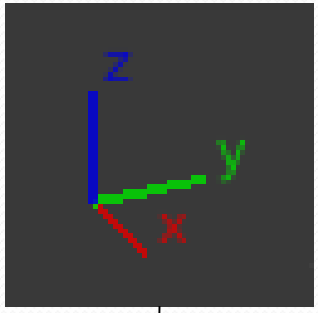
6. Navigation in the viewport



Specific viewing angles



Viewport properties (N Key or View + Properties)



X is the left and right
Y is the forward and back
Z is the up and down

III. Introduction to Blender

7. Blender Customizing

- Setting the user preferences
  - Accessible via File > User Preferences
  - **Interface**: The Interface preferences allow to customize how the menus, Viewport, and navigation react to the users.
  - **Editing:** The Editing preferences let customize object properties.
  - **Input:** The Input preferences allow to configure custom hot keys for Blender to better suit the workflow.
  - **Add-Ons:** This pane, gives access to many add-ons that are available by default in Blender.
  - **Themes**: Everything can be changed exactly to your liking through this panel.
  - **File**: The File preferences contains settings related to saving and loading Blender files.
  - **System**: The System preferences pertain to settings that affect Blender's speed and performance.

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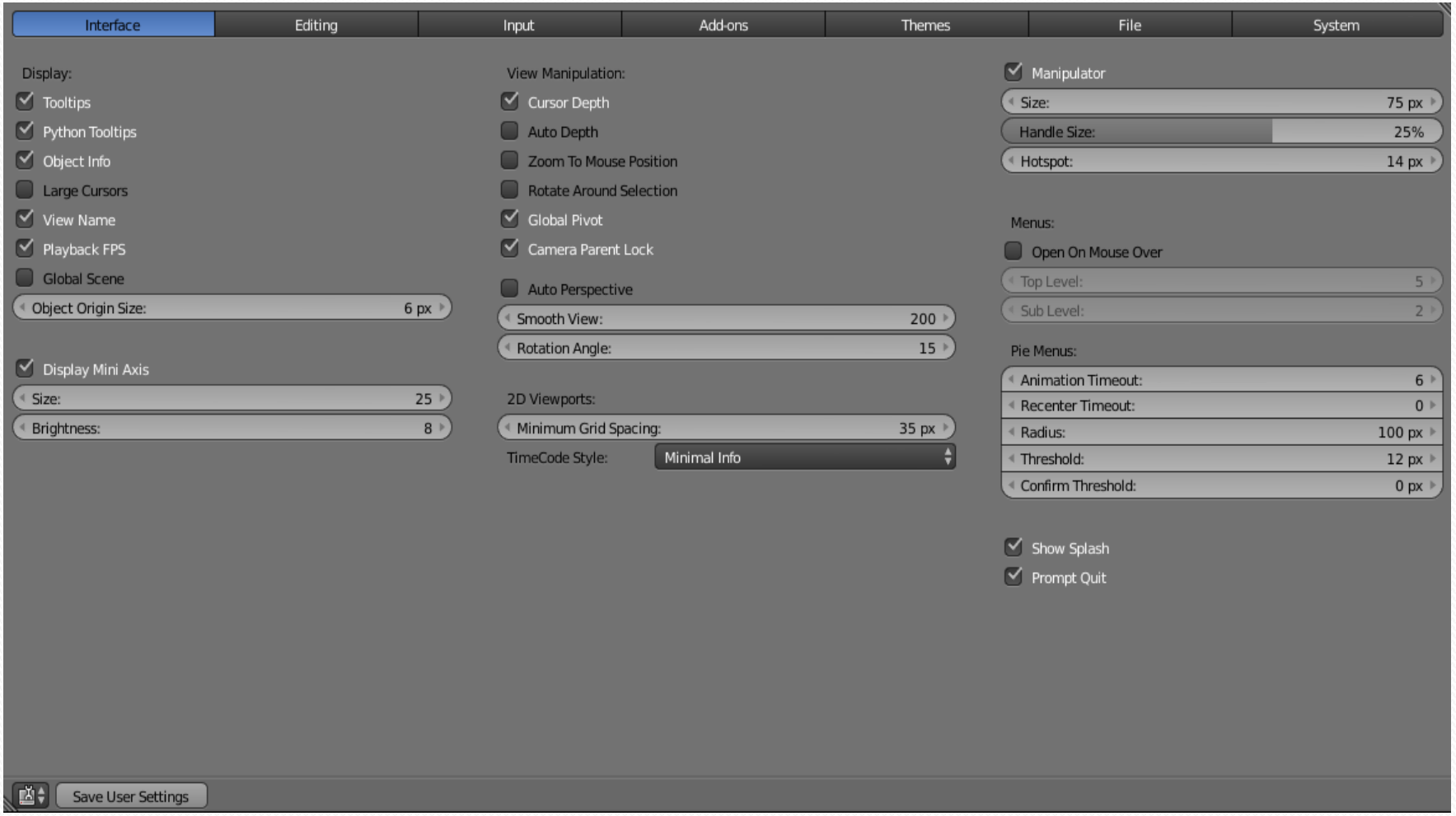
7. Blender Customizing



III. Introduction to Blender

7. Blender Customizing

- Changing Blender's Layouts
  - Splitting the Viewport : Two methods
    - Using the handles at the bottom-left and upper-right corners of the Viewport. By **dragging up the handle you will split the view horizontally**, by dragging to the right you will split it vertically (1)
    - By clicking with your RMB on the divider between the panels
  - Merging Panels : the reverse operation of the splitting (2)
  - Changing Window Types: providing access to a specific set of tools, options, viewers… (3)

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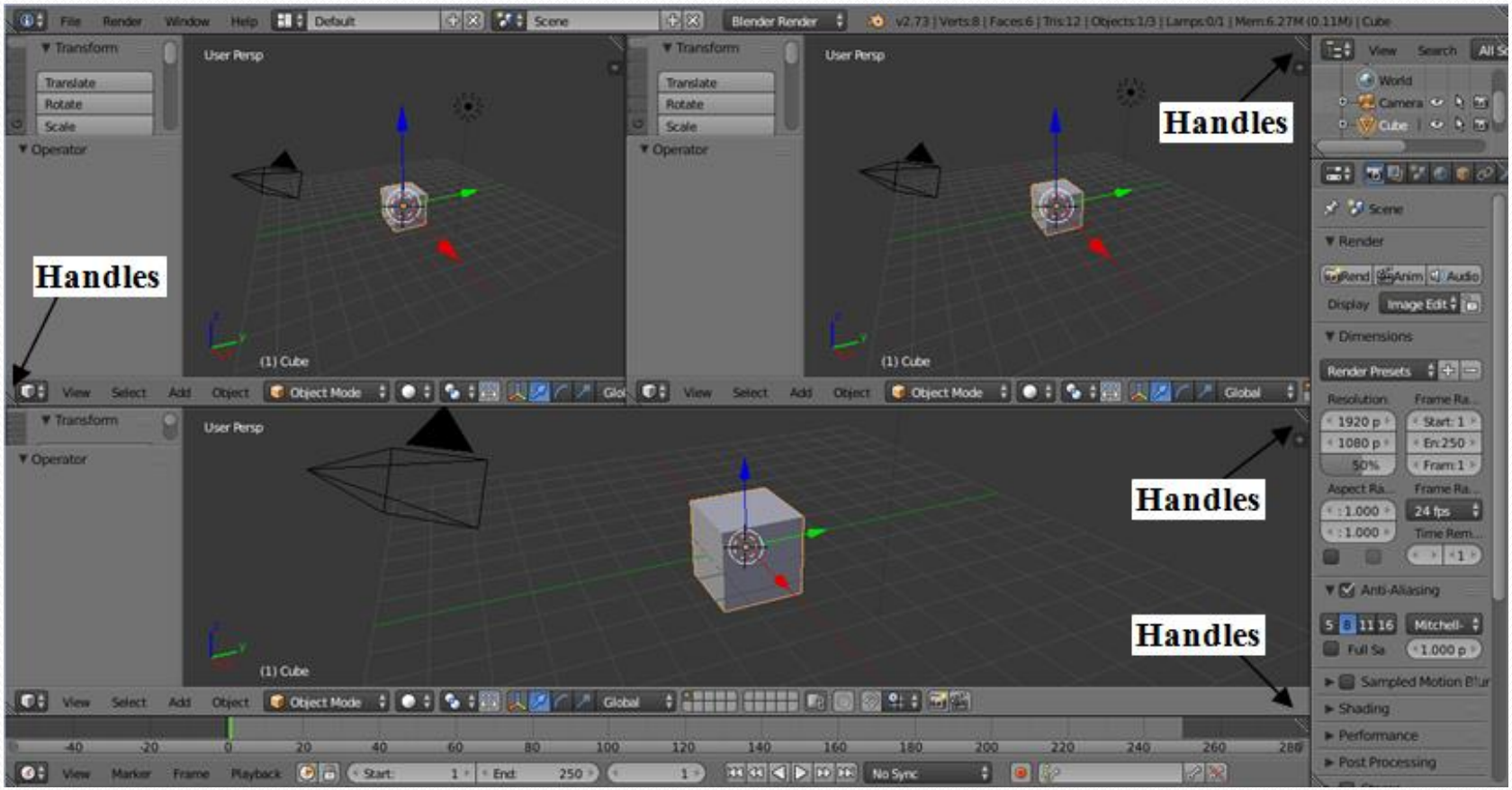
7. Blender Customizing



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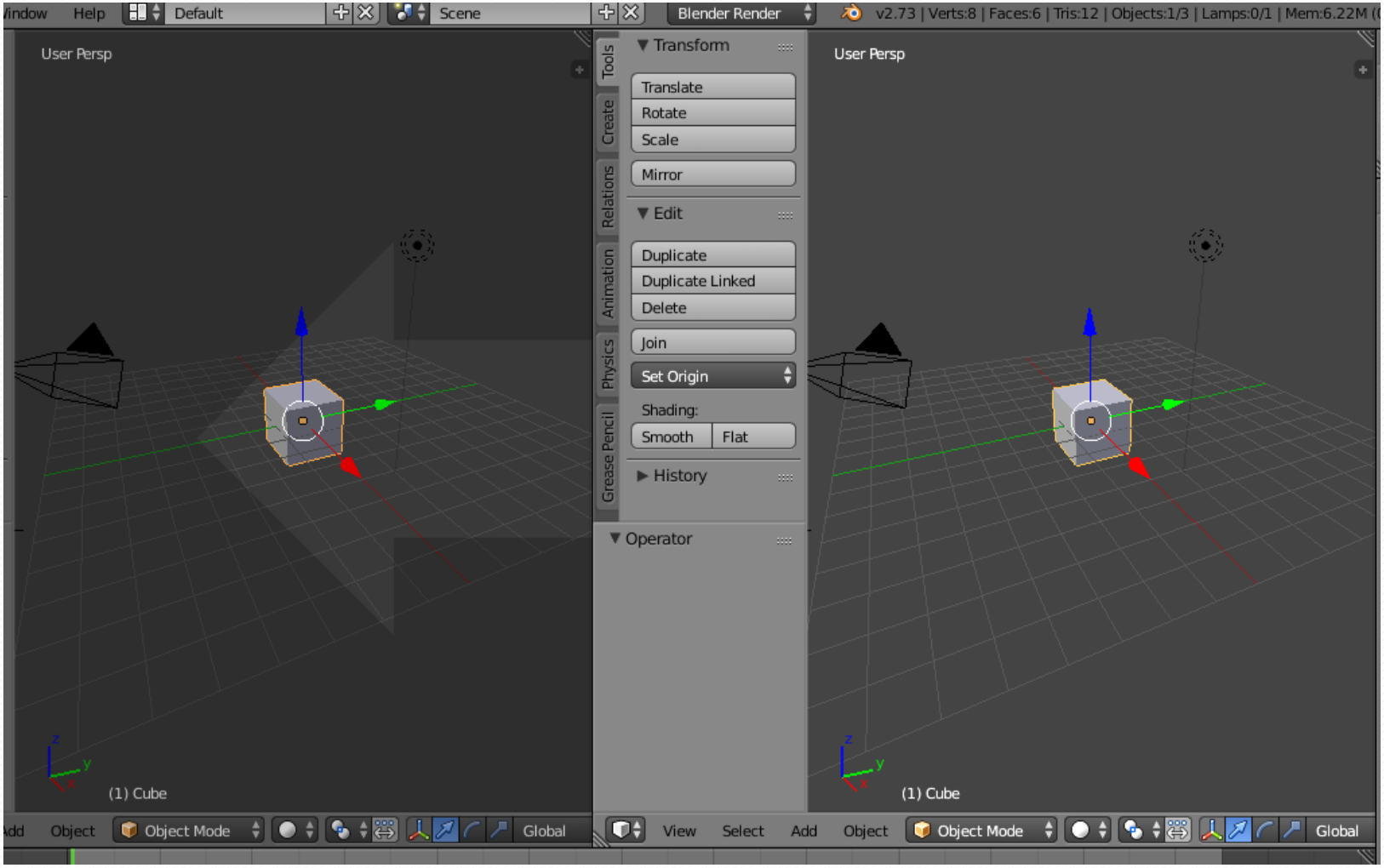
7. Blender Customizing



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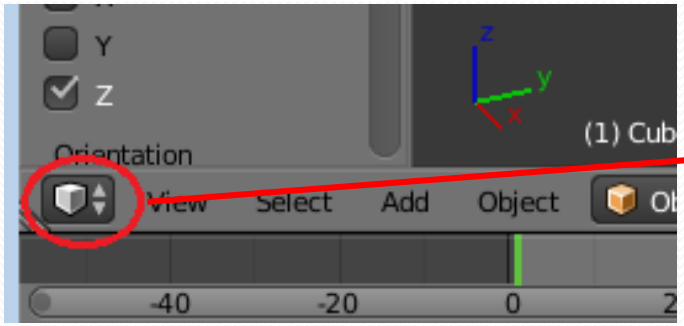
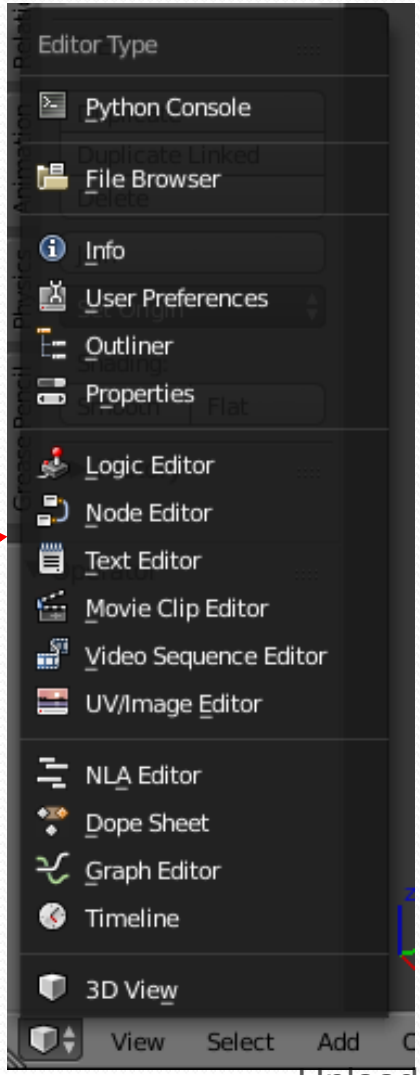
7. Blender Customizing



Available window types



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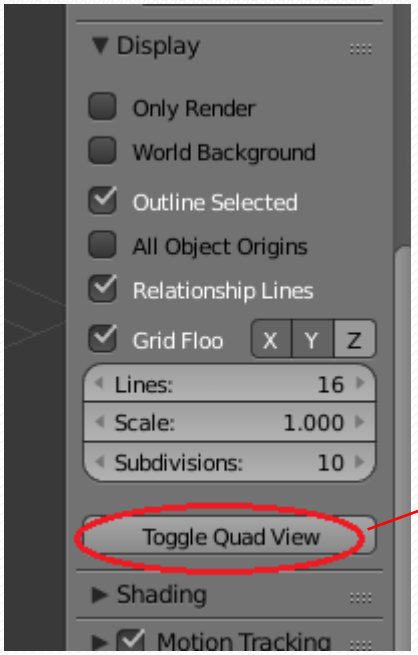
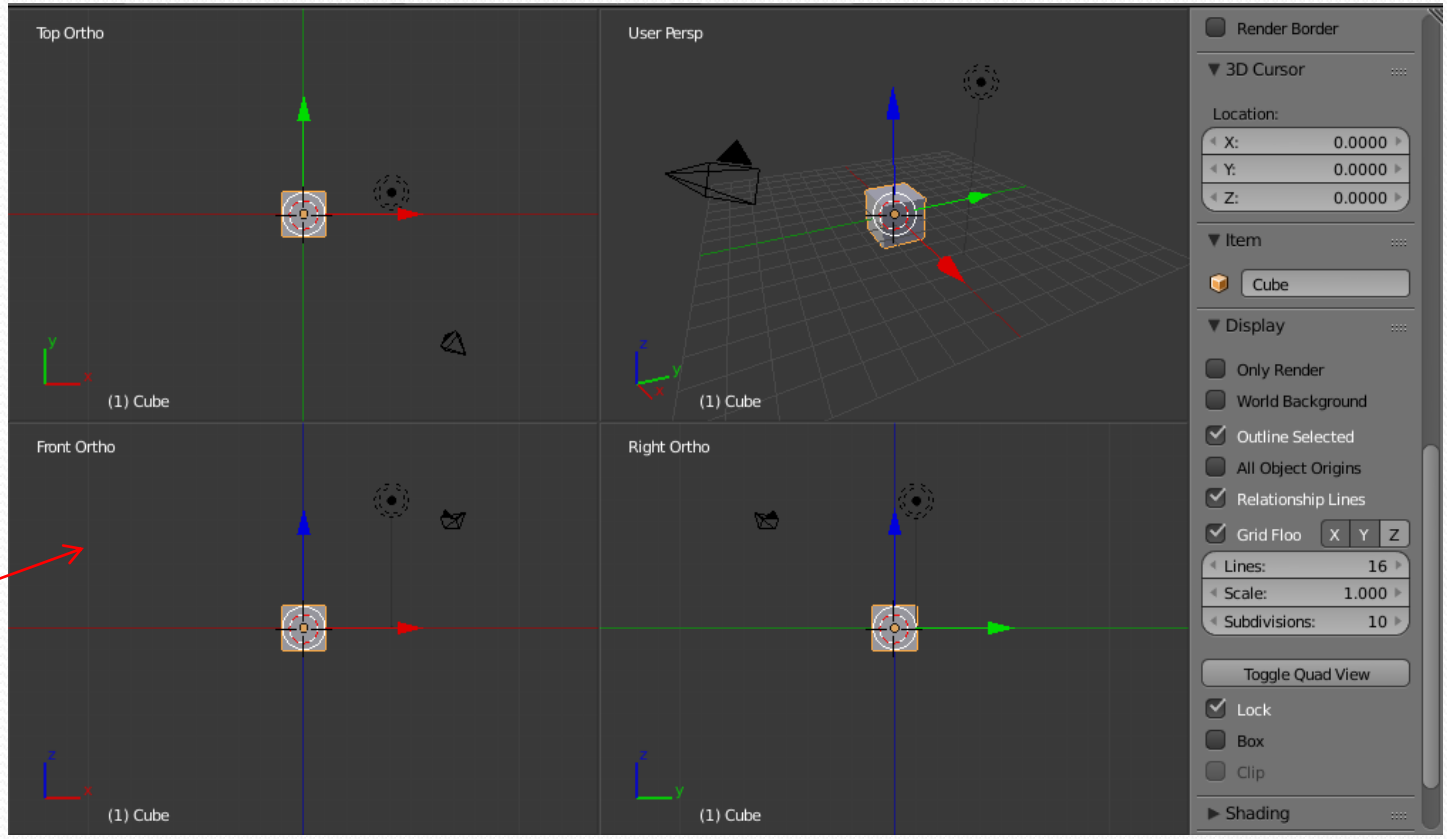
7. Blender Customizing

- Changing Blender's Layouts
  - Activating Quad View (4)
    - Provide a view from the top, front, and right, and a camera/user perspective
    - Press N Key, click Toggle Quad View from the Display category of the Viewport properties
  - Using the Screens Option: gives access to different layout types (5)

III. Introduction to Blender

7. Blender Customizing





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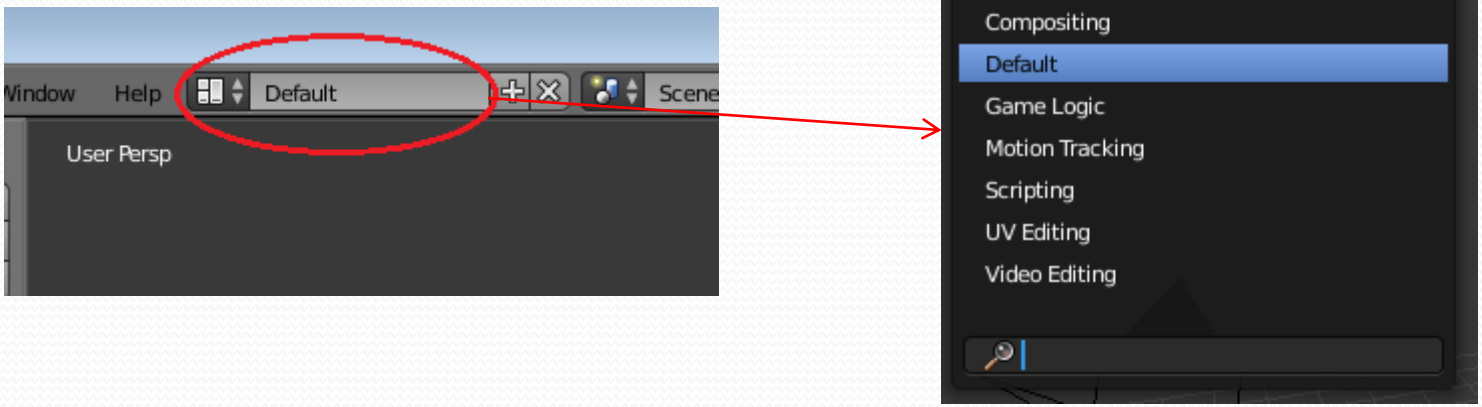

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Activity

Activity 1.3	**Title:** Set Blender viewport and layout
Type:	Individual activity- Lab exercise
Goal:	Illustrate how can we manipulate the Blender viewport and layout ILO P1
Outline:	During this activity, students should: • Split the viewport in two lines and two columns using the two different techniques. After each splitting operation, merge the different panels to obtain the default viewport • Change the Blender's layout as you want
Timeline	5 minutes
Assessment	Assess the ability of each student to control the Blender viewport and layout

Thank you for your attention!