Introducing Blender Version 3.0.0

The Complete Guide to Blender Graphics

Computer Modeling & Animation

SEVENTH EDITION

JOHN M. BLAIN

CRC Press
Taylor & Francis Group
AN A K PETERS BOOK

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Introduction

The Program and the Book

The Book – The Complete Guide to Blender Graphics - 7th Edition

The Complete Guide to Blender Graphics - 7th Edition provides instruction in the use of the Computer Graphics 3D Program **Blender.** The book is an operation manual for those who wish to undertake a learning experience and discover a wonderful creative new world of computer graphics. The book also serves as a reference for established operators.

Instructions throughout the book introduce Blender's features with examples and diagrams referenced to the **Graphical User Interface (GUI).**

The Complete Guide to Blender Graphics originated when Blender's Graphical User Interface was transformed with the release of Blender version 2.50. Subsequent editions of the book have kept pace with developments to the program and have included new material.

The **7th Edition of The Complete Guide to Blender Graphics** is applicable to **Blender Version 2.93.4 LTS \ 3.0.0** incorporating changes to the program such as a modified application of Materials (color) and Textures, the inclusion of Geometry Nodes and revised procedures for using Drivers.

For new users this book provides a fantastic learning experience in **Computer Graphics** using **Blender,** by introducing the operation of the Blender program through the use of its' Graphical user Interface. The book is intended to be read in conjunction with having the program in operation, with the interface displayed.

Instruction is presented using the tools displayed in the Graphical User Interface, with basic examples demonstrating results. Understanding where tools are located, their uses and how they are implemented will allow the reader to more easily follow detailed instruction in the many written and video tutorials available on the Internet.

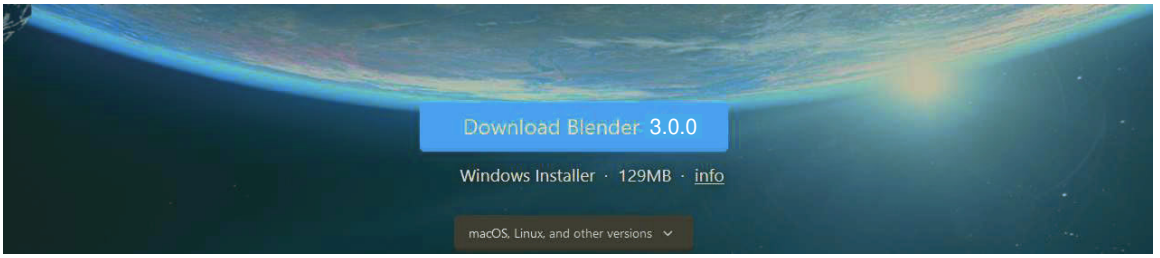
The Program - Blender

Blender is a 3D Computer Graphics Program with tools for modeling and animating objects and characters and creating background scenes. Scenes may be made into still images. Animated sequences may be used for video production. Models and Scenes are enhanced with color and texture producing brilliant realistic effects. The still images and video may be for artistic appreciation or employed as architectural or scientific presentations. There are also tools for 2D animation production. Stand alone models may be used for 3D Printing.

The Blender program is maintained by the **Blender Foundation** and released as **Open Source Software** which is available for download and **FREE** to be used for any purpose.

The program may be downloaded from:

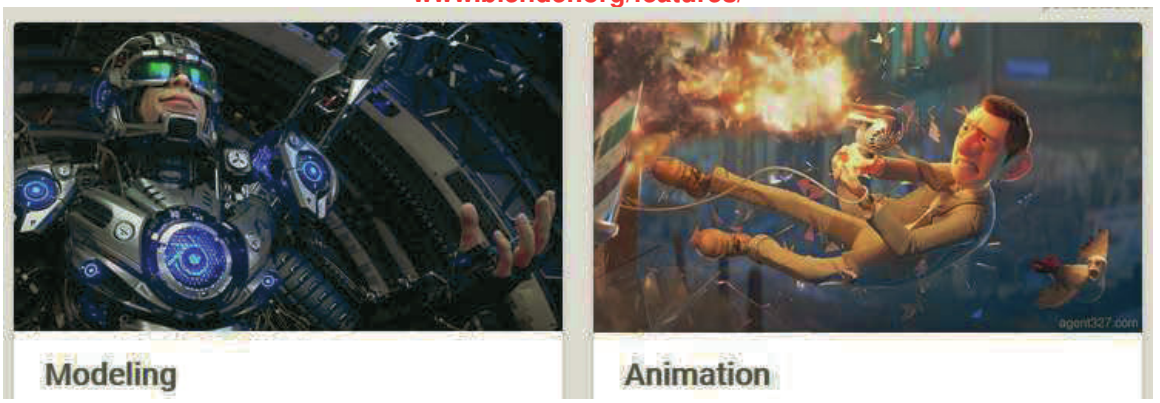
www.blender.org



Blender Features

A comprehensive display of the Blender features is available at:

www.blender.org/features/



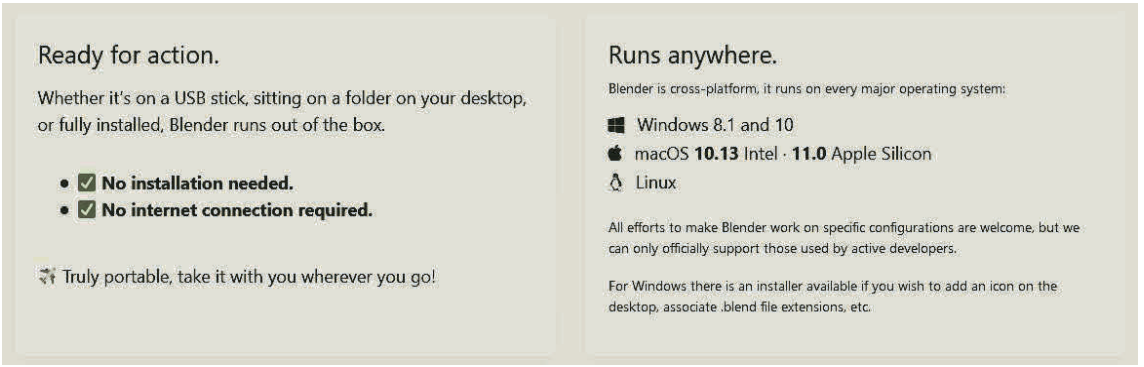
Blender Platforms

A **computing platform** or **digital platform** is the environment in which a piece of software is executed. It may be the hardware or the operating system (OS)

Blender is a cross platform application for **Windows , Linux** and **MacOS** operating systems.

The operation of Blender in this manual is applicable to all operating platforms but operations ancillary to the program, such as, saving work to the computers hard drive, have been described exclusively using a Windows operating system.

System Requirements



Hardware Requirements

Minimum	Recommended	Optimal
64-bit dual core 2Ghz with SSE2 support	64-bit quad core CPU	64-bit eight core CPU
4 GB RAM	16 GB RAM	32 GB RAM
1280 x 768 display	Full HD display	Full HD display
Mouse, trackpad or pen + tablet	Three button mouse + tablet	Three button mpuse + tablet
Graphics card with 1 GB RAM, OpenGL 3.3	Graphics card with 4 GB RAM	Graphics card with + 12 GB RAM

Supported Graphics Cards

Always make sure to install the latest drivers from the graphics card manufacturer website. These requirements are for basic Blender operation. Cycles rendering using the GPU has higher requirements.

NVIDIA

GeForce 400 and newer. Quadro Tesla GPU architecture and newer, including RTX-based cards, with NVIDIA drivers (list of all GeForce and Quadro GPUs).

AMD

GCN 1st gen and newer. Since Blender 2.9.1, Terascale 2 architecture is fully depreciated, try using 2.90 (albeit not supported)

Intel

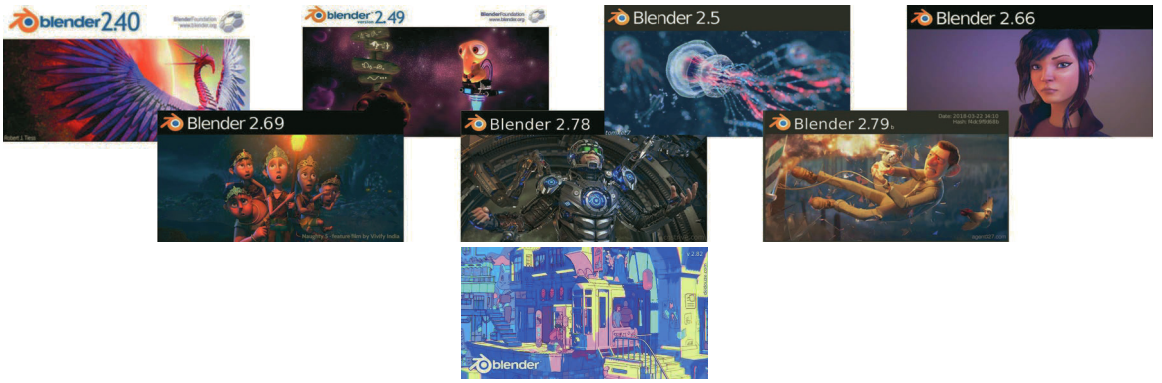
Haswell architecture and newer. [list of all Intel GPUs]

macOS

Version 10.13 or newer for Intel processors on supported hardware. Version 11.0 for Arm-based processors (Apple Silicon).

Program Evolution

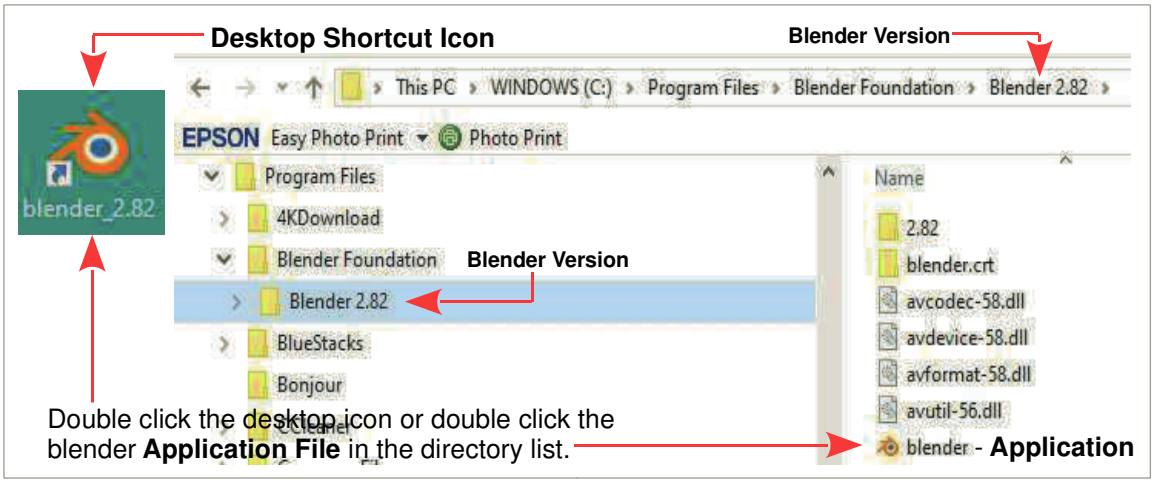
Blender is continually evolving. New versions of the program are released as additions and changes are incorporated, therefore, it is advisable to check the Blender website, from time to time.



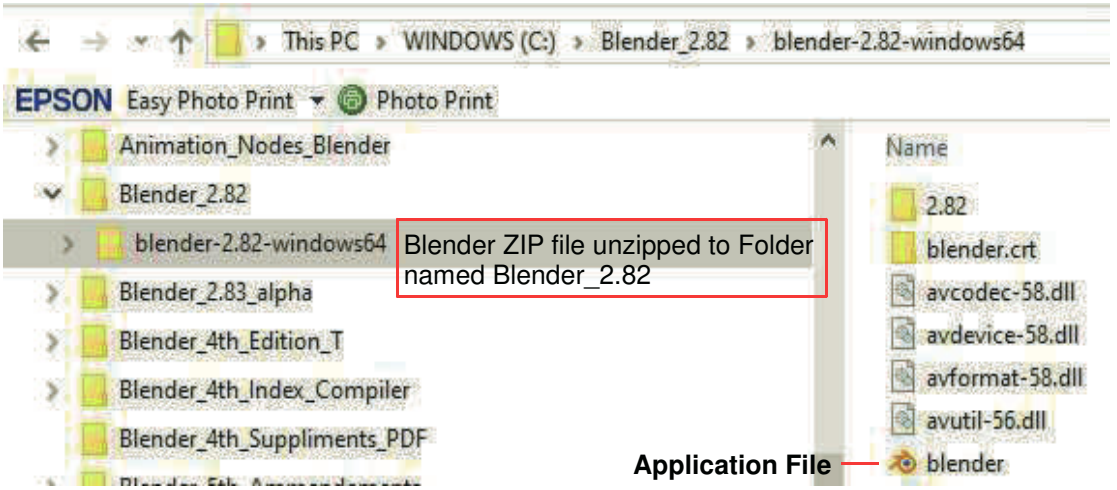
Earlier versions of the program and documentation may be obtained which provide valuable information when you are conversant with the current release of the program. Video tutorials available on the internet also provide valuable information but may not strictly adhere to the current user interface or work flow. Major transformations occurred when the program changed from version 2.49 to 2.50 and again at the change from version 2.79 to version 2.82. Since 2.82 development has continued.

Starting the Program

How you start Blender depends on how you have installed the program (see Download & Installation following). If you have used the **MSI installer option** for Windows, Blender will be in the Program Files directory on your C: Drive and a shortcut icon will have been placed on your desktop. If you have installed to a Windows operating system, Blender will be listed under, Program Files\ Blender Foundation\ Blender.



If you have downloaded and unzipped the compressed (ZIP) file for Blender the **blender.exe** application file will be located in the folder where you unzipped the compressed file. Open the folder and double click **blender.exe** or right click and select **Open**.



Note: By having one version of Blender installed via the Installer(.msi) option and another using the ZIP method you can have more than one Blender version installed on your computer at the same time. This is useful for version comparison or for development purposes. The diagrams depict Windows 10 File Explorer. At the time of writing Windows 10 is the current version with Windows 11 forcast for release. It is anticipated that the Windows 11 File Explorer will be similar.

Shortcut

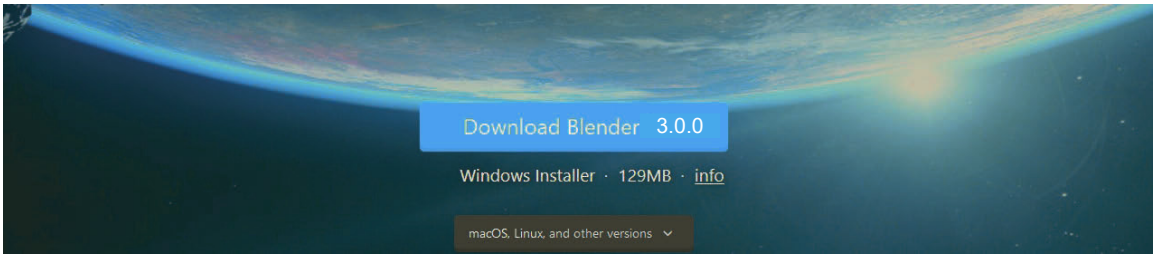
In the directory containing the **blender.exe** file create a shortcut and place it on the desktop.

The Manual Compilation

This manual has been compiled with reference to program builds leading to the release of Blender Version 3.0.0. As new builds are released, subtle changes improving the program's interface are implemented and new program features are incorporated. Every effort has been made to include these changes in diagrams and instructions which demonstrate operational features of the program.

Images used to construct diagrams may occasionally differ to what you see on your computer screen. The Blender screen display may be customized or modified to suit individual user preferences. There are several in built display themes which you may choose. In some cases the screen display has been altered to facilitate the construction of diagrams (Figures) and enhance visibility of construction lines. When alterations have been made they do not detract from the instruction presented.

Download & Installation

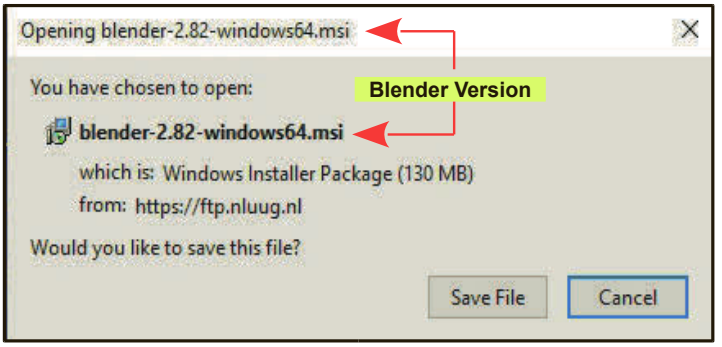


Download Blender

Download Blender from: **www.blender.org**

Select the current Blender version which is applicable to your operating system. Blender is available for Windows, MacOS, Linux and Steam.

The download options are shown in the previous diagram. Selecting the Windows Version presents the MSI Installer which you save to your PC.



With a Windows operating system the MSI Installer will be saved to the Downloads Folder.

Note: The diagram shows the download file for Blender version 2.82. The current version is Blender 3.0.0.

Installation on a Windows Operating System

Installing with the Installer(.msi) Option

Double click on the file name in the Downloads folder, follow the prompts and Blender will be automatically installed to the **Program Files** folder on your computer and an icon will be placed on your **Desktop**.

Installing with the ZIP Option

In some cases you can download a compressed ZIP File instead of an MSI Installer.

With a ZIP file you have to unzip the file. You first create a new folder on your computers hard drive then use a program like 7-Zip or Win-Zip to unzip (decompress) the zip file into the new folder (see the note at the end of the chapter).

When the file is unzipped into the new folder you will see **blender.exe** as one of the entries. You double click on this to run Blender or you create a shortcut which places an icon on your desktop.

When using either installation option you double click the **blender.exe** file to run the program. Shortcuts on the Desktop are shortcuts to the blender.exe file.

Note: By having one version of Blender installed via the Installer(.msi) option and another using the ZIP method you can have more than one Blender version installed on your computer at the same time. This is useful for version comparison or for development purposes.

Installing Blender on a Linux Operating System

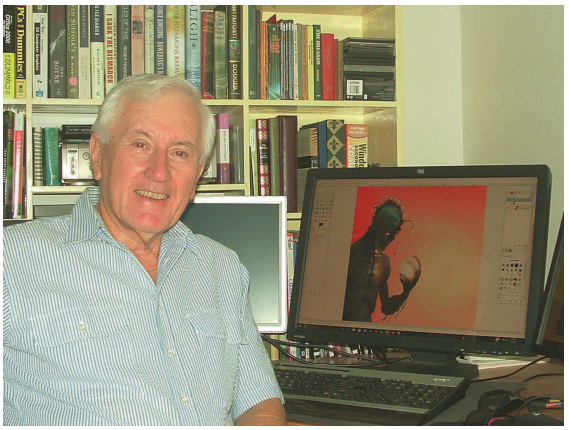
macOS

https://docs.blender.org/manual/en/latest/getting_started/installing/macos.html

Linux

https://docs.blender.org/manual/en/latest/getting_started/installing/linux.html

The Author



John M. Blain was born in 1942 in Swindon, Wiltshire in England and emigrated to Canada with his family in 1952. He now lives in Coffs Harbour, New South Wales in Australia.

Drawing and painting were skills John developed from an early age and while attending school on Vancouver Island he became interested in wood sculpture inspired by the work of the indigenous west coast people. Artistic pursuits were curtailed on graduating from high school when he returned to England to undertake a technical engineering apprenticeship. Following his apprenticeship he worked for a short period in England then made the decision to return to Vancouver, Canada. On the voyage between Southampton and Vancouver he met his wife to be and Vancouver became a stopover for a journey to Sydney Australia. In this new country he began work as an engineering draughtsman, married, had children and studied engineering . The magic milestone of seven years saw John with his young family move out of the city to the coastal town of Coffs Harbour, New South Wales.

Coffs Harbour was a center for sawmill machinery and John became engaged in machinery design and manufacture. He acquired a sound knowledge of this industry acting as installation engineer then progressing to sales. This work afforded travel throughout Australia, Canada, the United States and New Zealand.

On retirement, artistic pursuits returned with additional interests in writing and computing. Writing notes whilst learning computer animation using Blender resulted in **The Complete Guide to Blender Graphics**. The first edition, published in 2012, was well received and encouraged John to compile a second edition in line with the latest version of the Blender program. This afforded the opportunity to include new material. Subsequent editions have followed until this new reformatted seventh edition.

Preamble

The objective of the Preamble is to explain terminology and introduce diagrams which demonstrate instructions.

Basic Objective – Graphics Program

The fundamental objective in using a computer graphics program, such as Blender, is to produce a display on a computer Screen which converts (**Renders**) into a digital image or series of images for an animation sequence. The display may only contain a single inanimate model such as that used for 3D printing but will will usually contain multiple 3D models of animate and or inanimate Objects. The arrangement of **Objects** constitutes a **Scene**. Animate Objects (animated Objects) are the moving characters in animation sequences. Inanimate Objects are the components of a Scene with which the characters interact. These may be obstacles in a Scene such as, ground planes, terrain and background.

Assumption

Before you begin to read this book it is assumed you know how to operate a computer. In the past this assumption meant you knew how to operate using a keyboard and mouse. Today many of you will be more familiar with touch screens or laptop touch pads, therefore, although this may appear to be a retrograde step the first instruction will be to familiarise you with Mouse and Keyboard operations.

Blender has been designed to be operated using a Keyboard and Mouse and instruction will be provided using these devices. You may of course adapt a drawing tablet and stylus.

Formats Conventions and Commands

In writing this book the following format conventions have been adopted:

> Paragraphs are separated by an empty line and have not been indented.
>
> Key words and phrases are printed in **bold text** with the first letter of a component name specific to Blender capitalised.
>
> Headings are printed in **Bold Olive Green.**

The following conventions will be used when giving instructions.

> **When using a Mouse** connected to a computer, the commands will be:
>
> **Click** or **Click LMB** – In either case this means make a single click with the left mouse button with the Mouse Cursor positioned over a control on the computer Screen.

In some instances it is explicit that the left mouse button should be used.

A Control: Is a designated area on the computer Screen represented by an icon in the form of a button or bar, with or without text annotation.

Double Click – Make two clicks in quick succession with LMB (the left mouse button).

Click, Hold and Drag – Click the left mouse button, hold it depressed while moving the mouse. Release the button at the end of the movement.

Click RMB – Click the right mouse button.

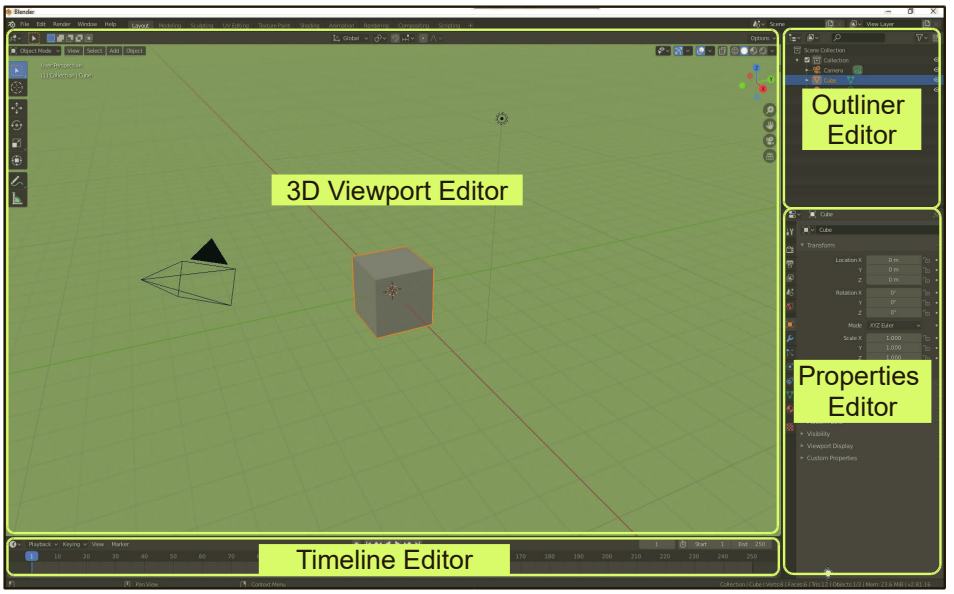
Click MMB – Click the middle mouse button (the middle mouse button may be the scroll wheel).

Scroll MMB – Scroll (rotate) the scroll wheel (MMB).

Clicking is used in conjunction with placing the Mouse Cursor over a button, icon or a slider which is displayed on the Screen.

The Graphical User Interface (GUI)

When Blender is first opened what you see on the computer Screen is the **Graphical User Interface (GUI)** for the program. This arrangement of panels is the interface which allows you to communicate with the program by entering commands (data) using the Keyboard and Mouse, previously described. The panels that you see are called **Editors**.



Editors

Editors (the panels in the **GUI**) are so named since the basic philosophy in operating the program is; You are presented with a set of default data producing a Screen display. You edit or modify the default data to create what you want.

There are numerous Editors for selection depending on the particular feature of Blender you wish to use. The different Editors will be introduced as features of the program are encountered.

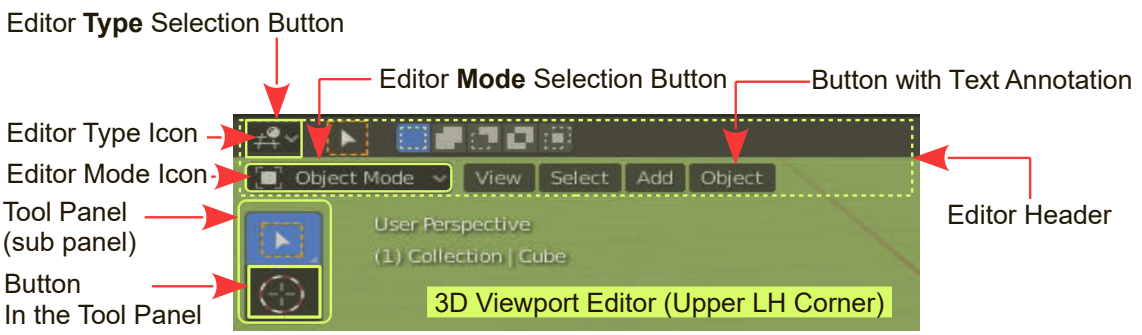
Editors interrelate since what occurs in one will affect what occurs in another. This interaction between Editors is particularly evident when considering the relationship between the 3D Viewport Editor and the Properties Editor. Editing data (entering or modifying) in the Properties Editor affects what is displayed in the 3D Viewport Editor.

Data is entered or modified by activating (clicking) controls in an Editor.

Controls - Buttons, Icons and Sliders

Each Editor in the **GUI** is a separate panel comprising a **Header** at the top of the panel and sub-panels which display within the Editor. The Header and sub-panels contain buttons which you click to activate functions or display menus for selecting functions. The buttons are displayed as text annotation, icons and panels. Each of these, relay data to the program to perform an action.

Example 1 : The 3D Viewport Editor (the default Screen display – **Upper LH Side**)

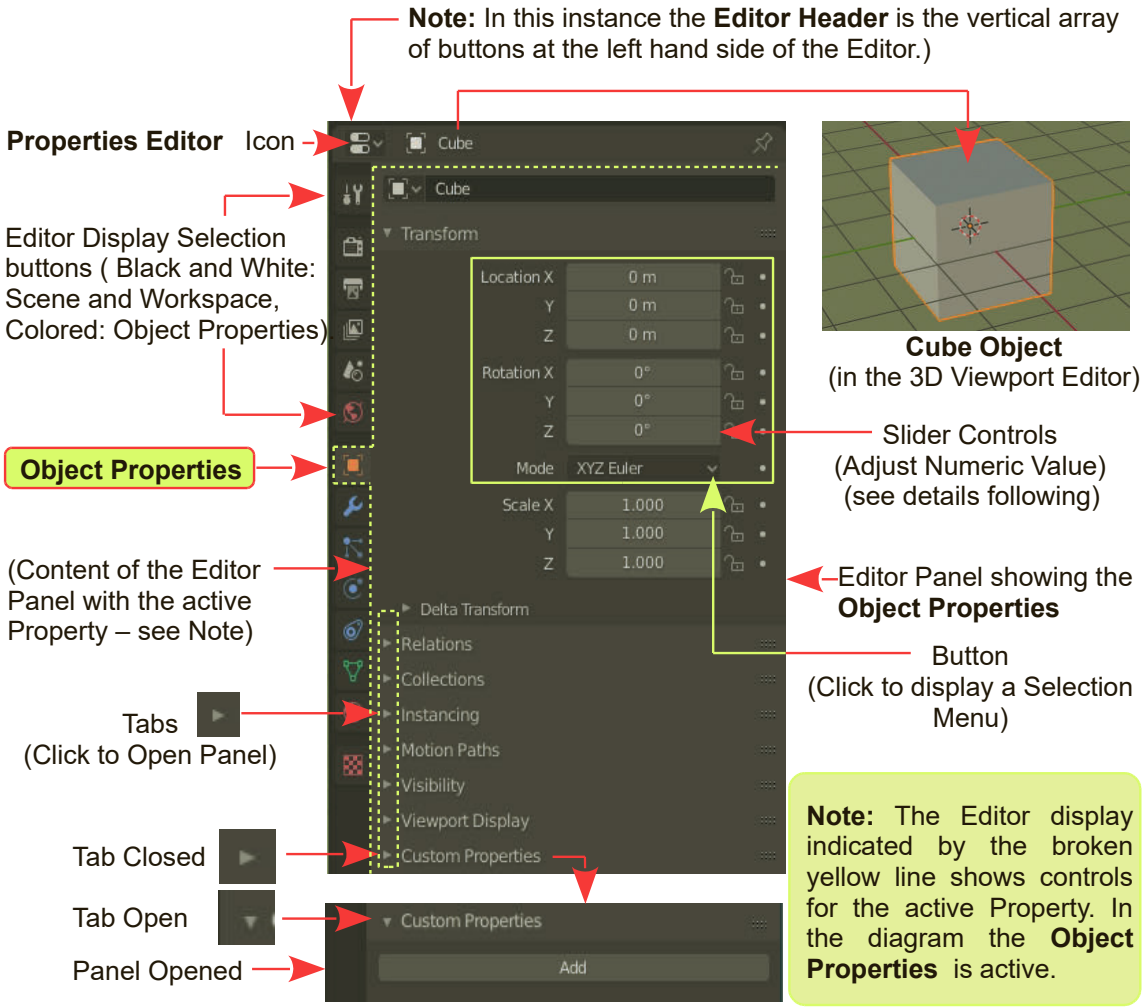


Note: The buttons shown in the diagram can be seen in the panel at the upper left hand side of the **default** Blender Screen arrangement. A detailed description of the Screen Arrangement with its Editors and panels constituting **Blender's GUI** (Graphical User Interface) is presented in **Chapter 1**.

Note: In giving instructions, **Default** means, that which is displayed on the computer Screen before any action is taken.

Example 2 : The Properties Editor (the default Screen display – Lower RH Side)

The default display shows the content of the **Properties Editor** with the **Object Properties** active. In this state the controls affect the default **Cube Object** in the 3D Viewport Editor.



A **Button** in Blender can be a small square or rectangular area on the screen or an elongated rectangle in which case it may be referred to as a bar. Some buttons display with icons.

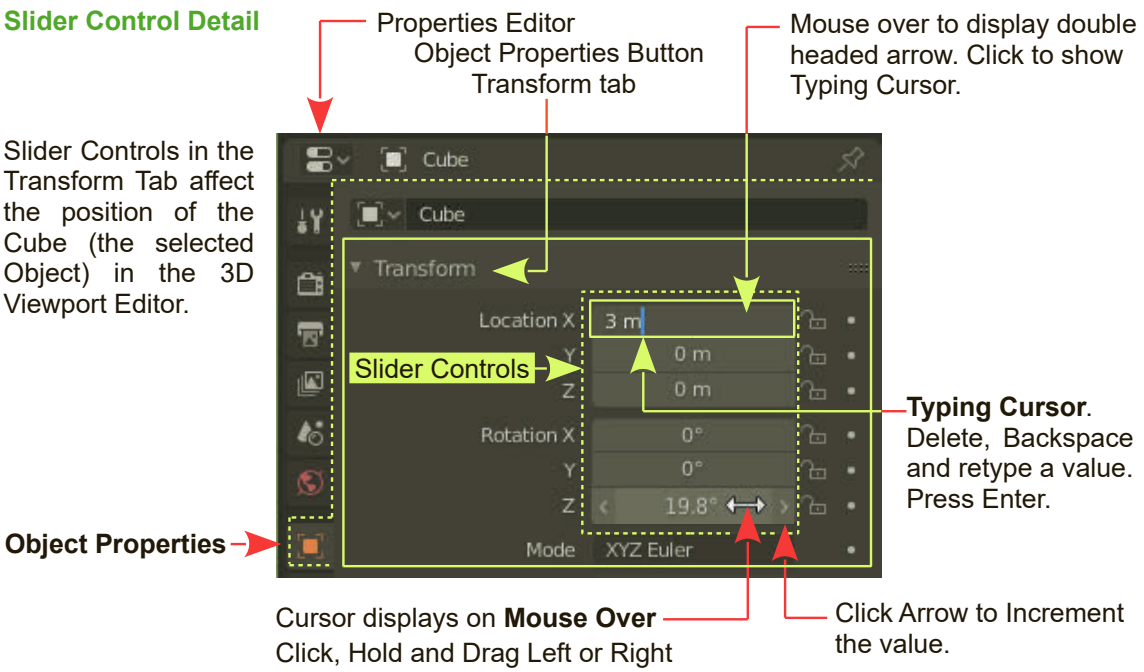
An **Icon** is a pictorial representation of a function. In the diagram the icon in the upper left hand corner indicates that the **Properties Editor** is displayed.

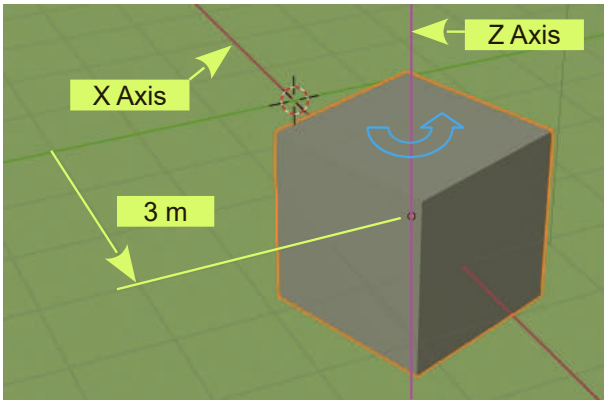
A **Slider** is an elongated area, usually containing a numeric value, which is modified by clicking, deleting and retyping the value, or clicking, holding and dragging the Mouse Cursor that displays on **Mouse Over**, left or right to decrease or increase the value. Some sliders have a small arrow at either end which display when the Mouse Cursor is **positioned over the Slider** (Mouse Over).

Click on an arrow to incrementally alter the value. Some sliders directly alter the display on the computer Screen.

Slider Control Detail

Slider Controls in the Transform Tab affect the position of the Cube (the selected Object) in the 3D Viewport Editor.





With the Cube Object selected in the 3D Viewport Editor, altering the X Location Slider value to 3m and the Z Axis Rotation Slider to 19.8° moves the Cube forward along the X Axis (Red Line) and rotates the Cube about the vertical Z Axis.

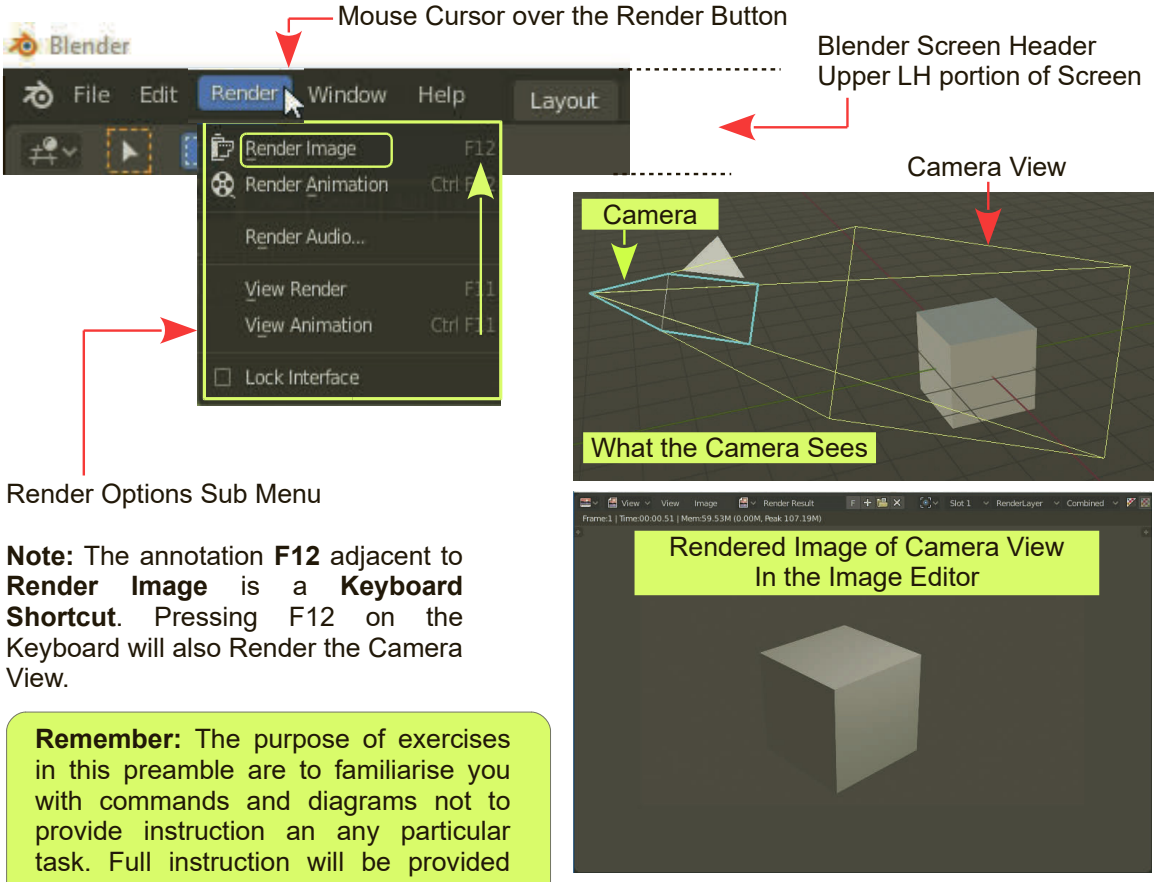
For Keyboard input, a command is; to press a specific Key or a series of Keys. Press **Shift + Ctrl + T Key** means, press and hold both the **Shift** and **Ctrl** Keys simultaneously and tap the **T Key**. **Num Pad** (Number Pad) Keys are also used in which case the command is Press **Num Pad 0** to **9** or **Plus** and **Minus**.

Command Instruction Example:

Go to the **Blender Screen Header, Render Properties,** click **Render Image:**

Remember: A control button, icon or slider which is displayed, indicates a specific location on the computer Screen. Positioning the Mouse Cursor at this location and clicking the Mouse button or depressing a keyboard button, inputs a signal to the computer. The interpretation , made by by the computer is; signal received at specific location = perform explicit computation and export result.

The example above means, in the **Blender Screen Header,** position the **Mouse Cursor** over the **Render Properties** button and click the left mouse button, clicking once. In this case the signal received by the computer with the Mouse Cursor at the position of the Render Properties button tells the computer to display the **Render Options Sub Menu**. Positioning the Mouse Cursor over **Render Image** in the sub menu and clicking once renders an image of **Camera View** (what the camera sees). The rendered image is displayed in a new Editor panel, the **Image Editor**. The image may be saved from this location but for the time being press **Esc** on the Keyboard to cancel the render and return to the 3D Viewport Editor.



Note: The annotation **F12** adjacent to **Render Image** is a **Keyboard Shortcut**. Pressing F12 on the Keyboard will also Render the Camera View.

Remember: The purpose of exercises in this preamble are to familiarise you with commands and diagrams not to provide instruction an any particular task. Full instruction will be provided later.

Book Work Flow

The initial work flow in the book will introduce the Editors and panels which make up the **Graphical User Interface (GUI)** and familiarise you with basic control operations. During the initial introduction detailed explanation of the Blender processes will be limited to a need to know basis. To start with, you will have to blindly follow along without understanding why. Explanation will be given as you progress and are made aware of the different Blender features.

In demonstrating one of the previous **Command Examples** the command was; **Click the Render button**.

Rendering

Rendering: The Definition from the Wiki when specifically applied to computer graphics follows. The Wiki? The Free Encyclopedia **Wikipedia.**

Https://en.wikipedia.org/wiki/Rendering_(computer_graphics)

Rendering or **Image Synthesis** is the automatic process of generating a photo realistic or non-photo realistic image from a 2D or 3D model (or models in what collectively could be called a Scene file) by means of a computer program. Also, the results of displaying such a model can be called **Rendering**. A Scene file contains objects in a strictly defined language or data structure; it would contain geometry, viewpoint, texture, lighting, and shading information as a description of the virtual Scene. The data contained in the scene file is then passed to a rendering program to be processed and output to a digital image or raster graphics image file. The term "rendering" may be by analogy with an "artist's rendering" of a Scene.

Render Engines - GUI Versions in Blender

Render Engines are the parts of the Blender program that produce the Screen display and convert the display into an image or sequence of images. Image sequences generate animations which in turn produce movie files.

In Blender 3.0.0 there are three **Render Engine options**. With the selection of each Render Engine type the Graphical User Interface (GUI) is displayed in a slightly different manner. Which option you chose depends on the particular process, to which the engine type is suited.

The Render Engines in Blender 3.0.0 are named; **Eevee Render, Cycles Render, Workbench Render.**

Eevee Render

The default Render Engine presented when Blender starts is **Eevee**. This is an acronym for "*Extra Easy Virtual Environment Engine".* Eevee can display a real time rendered view (depending on the Viewport Shading option selected – explanation to follow). In other words, what you see on the Screen as you make changes, is a good approximation of what you get in your final image view. Eevee quickly renders the Scene as you work but the quality of the render can incur a time disadvantage in the advanced stages of modeling.

Cycles Render

Cycles Rendering is specifically designed to produce a photo realistic high quality display of an image or frame in an animation incorporating colors, textures and special lighting. The quality of the display is adjustable since high resolution rendering comes at a cost with respect to time.

Workbench Render

Workbench Rendering uses the 3D View's drawing for quick *preview* renders. This allows you to inspect your animation (for object movements, alternate angles, etc.). This can also be used to preview your animations – in the event your Scene is too complex for your system to play back in real-time in the 3D View. You can use Workbench to render both images and animations.

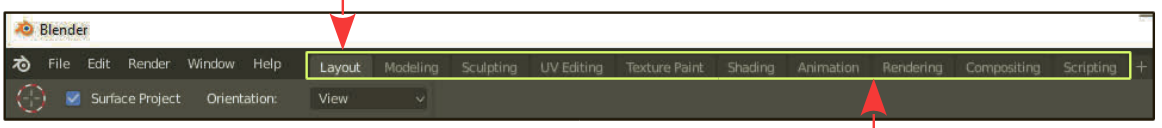
> **Note: Workbench Render** was formerly **OpenGL Render**. The definition has been taken from the Blender Manual. Each Render Engine type displays the view in the computer Screen in different ways **depending on the Viewport Shading method that you selec**t. This will be explained as you progress through the book.

Workspaces

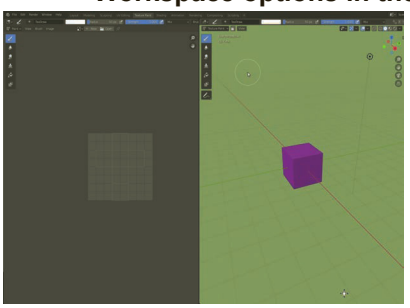
A **Workspace** is the arrangement or configuration of **Editor** panels on the computer Screen. Blender includes numerous Editors for specific functions and these Editors are selected and arranged to facilitate particular operations.

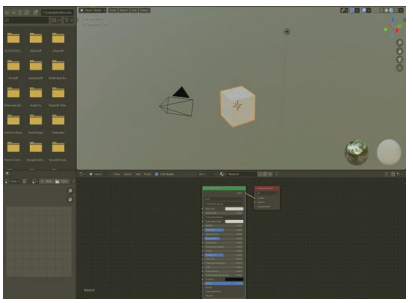
Several Workspaces (Editor arrangements) are provided and may be selected in the Blender Screen Header. There is also the facility for users to build and save specialised arrangements of Editors to suit their working environment for specific tasks.

Layout displays the default **Workspace** in the default Screen Arrangement

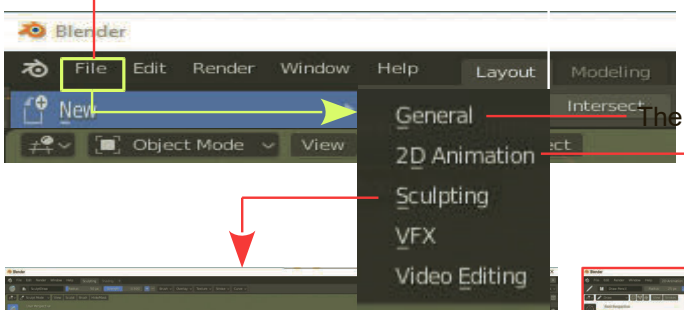


Workspace options in the Blender Screen Header

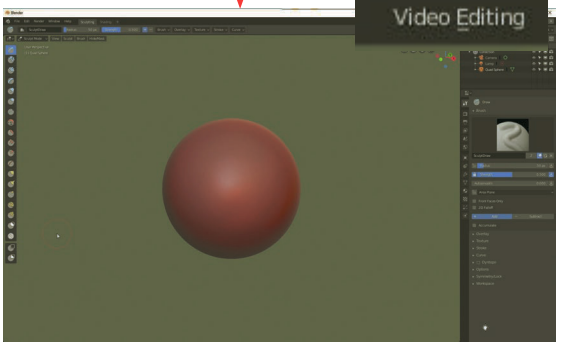




Although not designated as Workspaces there are five other Screen arrangements for specific tasks. In the Header at the top of the Screen, click on **File** then **New** to display the option menu.



The Default Screen Arrangement

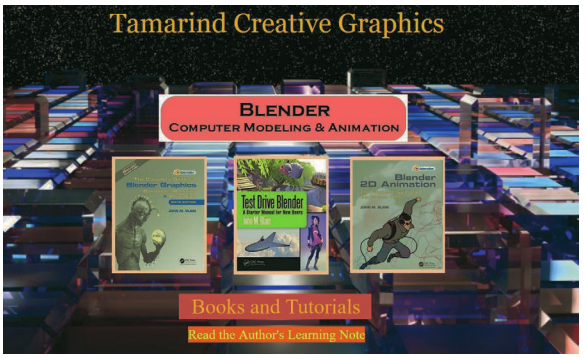


2D Animation – Grease Pencil

Blender incorporates a dedicated Workspace for creating 2D Animation called **The Grease Pencil**.

This environment provides 2D Animation tools within Blender's 3D Pipeline. 2D Animation creates characters, storyboards, and backgrounds in two-dimensional environments which may be used in advertisements, films, television, computer games, or websites and is just a fun thing to do.

The content and operation of the **Grease Pencil** is covered in a separate dedicated publication titled **The Complete Guide to 2D Animation using the Grease Pencil**. Content and sample pages may be viewed on the Author's website at: https://www.tamarindcreativegraphics.com



1

Understanding the Interface

The Interface

When Blender opens you are presented with a Screen arrangement displaying multiple windows. This arrangement is called the **Graphical User Interface (GUI)** (Figure 1.1). Windows in **Blender** are called **Editors.**

To get you started using Blender, this chapter will show you how to interact with the interface. This introduction will make you familiar with the Editors, entering command using the controls and give you an insight into how the different Editors interrelate. The Preamble preceding this chapter introduced controls, command instructions and presented example diagrams (**Figures**) touching on a sample of this material.

Of necessity, at this point, very few of the functions available in Blender will be explained in detail. This is just the beginning and it is assumed you are looking at Blender for the first time. Too much information may be confusing. In following chapters the information in Chapter 1 will be repeated and expanded.

By following the instructions with reference to diagrams you will see how Blender works and experience examples. Understanding the Interface and knowing what tools are available, which buttons to press and what to expect is the key to understanding Blender.

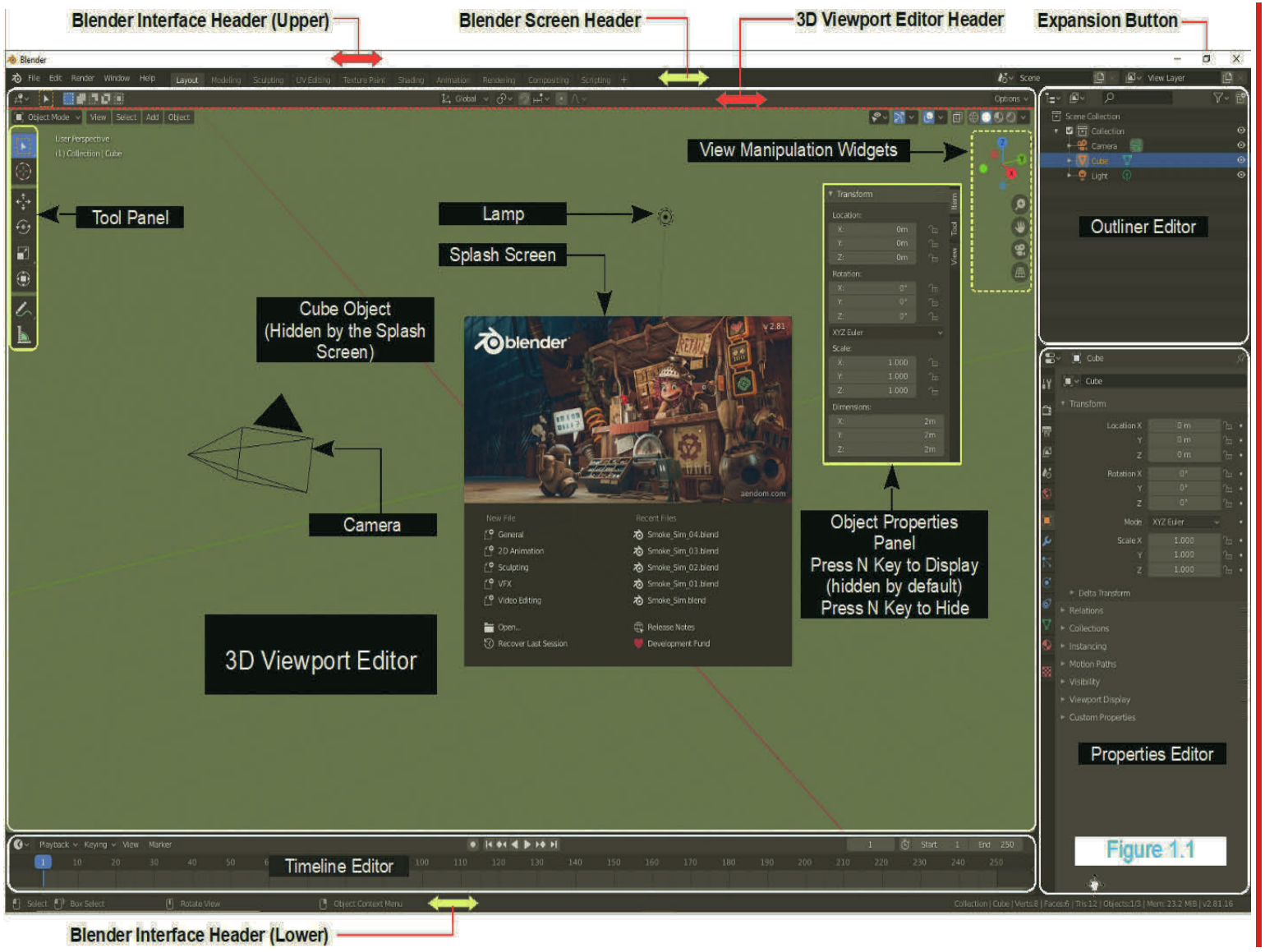

Blender Interface Header (Upper)
Blender Screen Header
3D Viewport Editor Header
Expansion Button
View Manipulation Widgets
Tool Panel
Lamp
Splash Screen
Cube Object
(Hidden by the Splash
Screen)
Camera
Outliner Editor
Object Properties
Panel
Press N Key to Display
(hidden by default)
Press N Key to Hide
3D Viewport Editor
Properties Editor
Timeline Editor
Blender Interface Header (Lower)

Figure 1.1

1.1 Interacting with the Interface

Before you can explore the Blender interface you have to know the fundamental procedures for entering commands to the program via the Keyboard and Mouse. Refer to the section titled **Formats Conventions and Commands** in the Preamble.

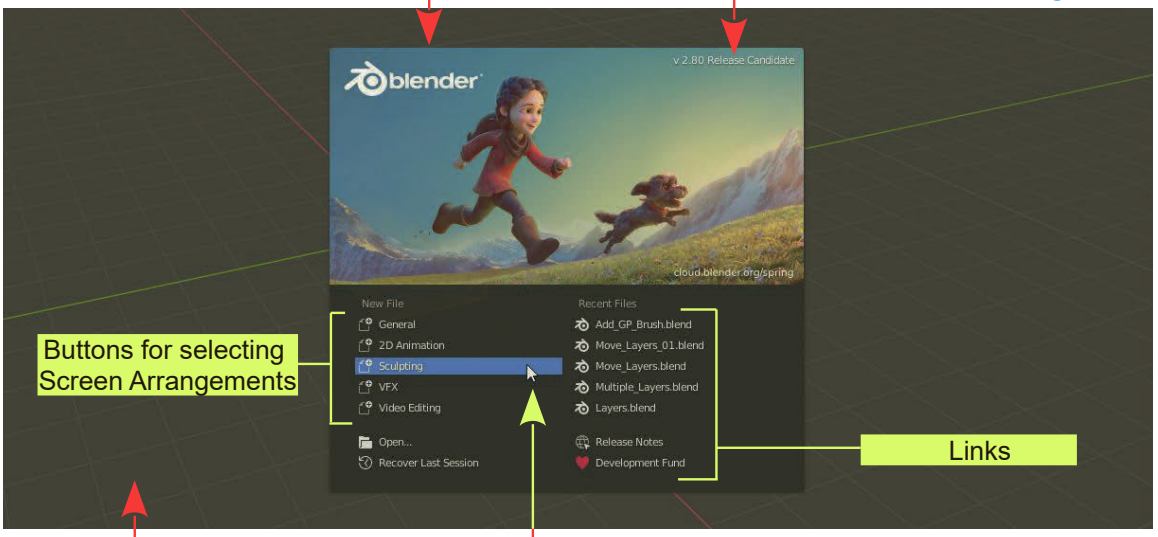
When Blender first opens, the Screen displays the **Graphical User Interface (GUI)** as shown in Figure 1.1. (**Note:** In Figure 1.1 Panels have been delineated with borders and the default background color of the 3D Viewport Editor has been altered).

The Blender **GUI** opens with the **Splash Screen** panel in the center, showing which version of Blender you have opened (Figure 1.2). There are links included in the **Splash Screen** and buttons which you click to access Screen arrangements for working with specific aspects of the program.

The **Splash Screen** (Blender Version 2.80)

Blender **Version** Number

Figure 1.2



3D Viewport Editor default dark gray color

The **Mouse Cursor,** positioned to select the **Sculpting Screen Arrangement**

Note: In Figure 1.1 borders have been added to distinguish the Editors and background colors have been changed. Figure 1.2 shows the Splash Screen for Blender Version 2.80 against the default dark gray background .The Splash Screen for Version 2.81 is different and for Version 3.0.0 different again.

Note: As features are introduced, detailed instruction will be deferred until you have acquired sufficient knowledge to understand the usage. In the early stages of learning Blender this will occur frequently, therefore, a reference will be given to detailed explanation.

1.2 First Interaction

Oops! You clicked the Mouse Button and the **Splash Screen** disappeared?

This is your first interaction with the **GUI**.

Clicking the left Mouse button with the **Mouse Cursor** in the **3D Viewport Editor** cancels the Splash Screen. Should you wish to reinstate it, position the Mouse Cursor over the little black and white Blender logo (button) in the upper left hand corner of the Screen (Figure 1.3).

Position the Mouse Cursor over the **Blender Logo** (highlights blue on Mouse Over)

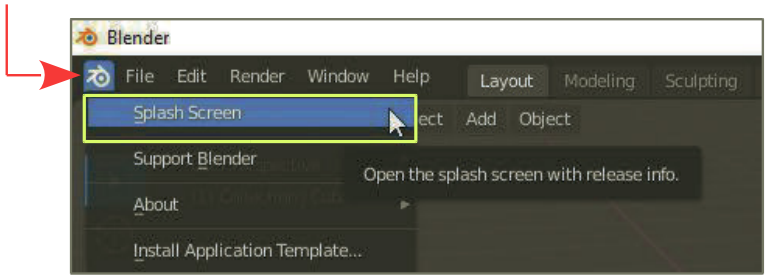


Figure 1.3

Click the Left Mouse Button (LMB), drag the mouse placing the cursor over **Splash Screen** (highlights blue on Mouse Over) and click LMB again. The Splash Screen is reinstated.

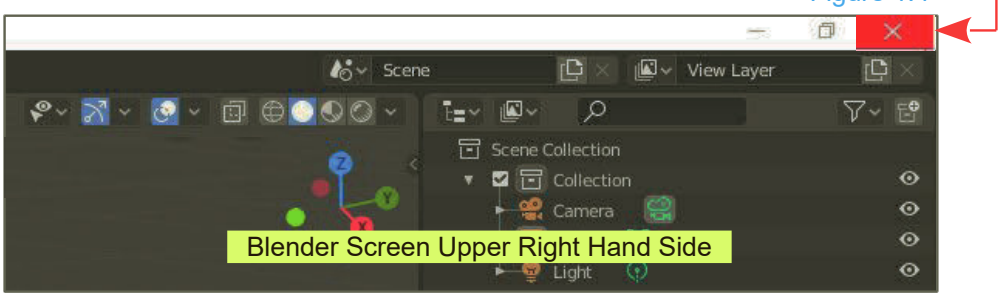
1.3 Second Interaction

When you start something it's a good idea to know how to quit. Blender is no exception. This may be stating the obvious but inevitably things will get messed up and, at some stage, you will want to start over fresh. There are two ways of doing this.

Close the Program and Restart

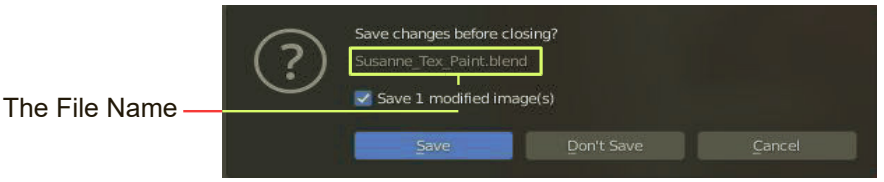
To close Blender click the **Cross** in the upper right hand corner of the Screen (Figure 1.4). **Click the Cross** means, place the Mouse Cursor over the Cross (Quit button) and click LMB.

Figure 1.4



Before **Blender** shuts down a panel displays with a reminder to save changes (Figure 1.5). At this point you can Save, Discharge Changes you have made (Don't Save) or Cancel quitting.

Figure 1.5

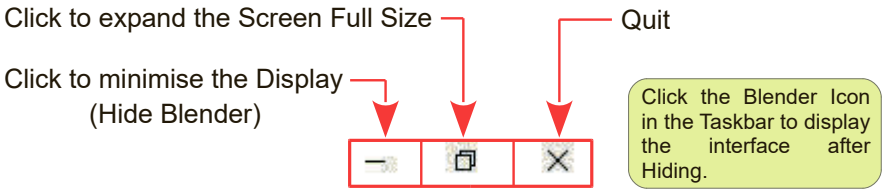


Note: When you click the Quit button at the top of the Screen the warning only displays when you have performed an operation. If you haven't done anything the warning does not display.

To Restart the Program double click the Blender Icon on your **Desktop**.

Note the two buttons adjacent to the **Quit button**.

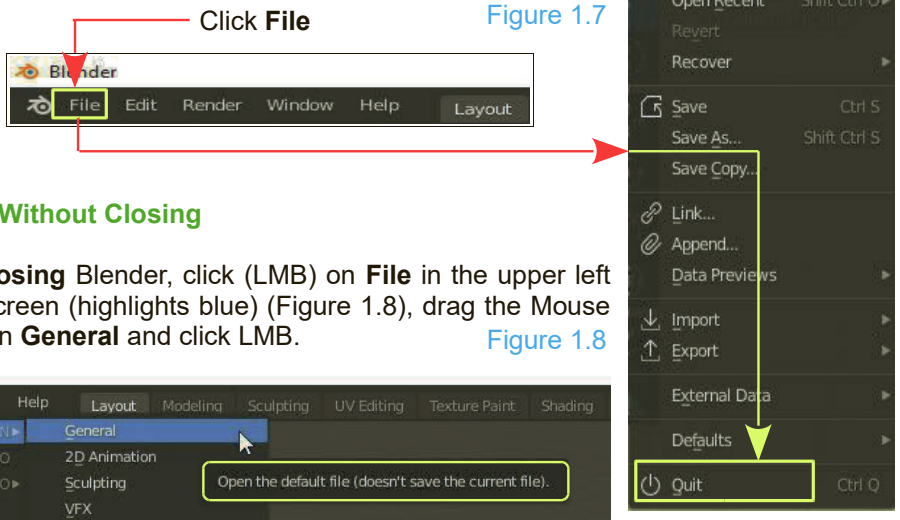
Figure 1.6



Closing the Program - Alternative Method

You may also close **Blender** by clicking on **File** in the upper left hand corner of the Screen and selecting (click) **Quit** in the menu that displays.

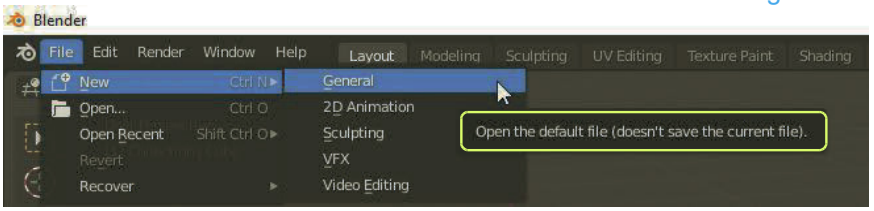
Figure 1.7



Start Over - Restart Without Closing

To restart **without closing** Blender, click (LMB) on **File** in the upper left hand corner of the Screen (highlights blue) (Figure 1.8), drag the Mouse Cursor over **New,** then **General** and click LMB.

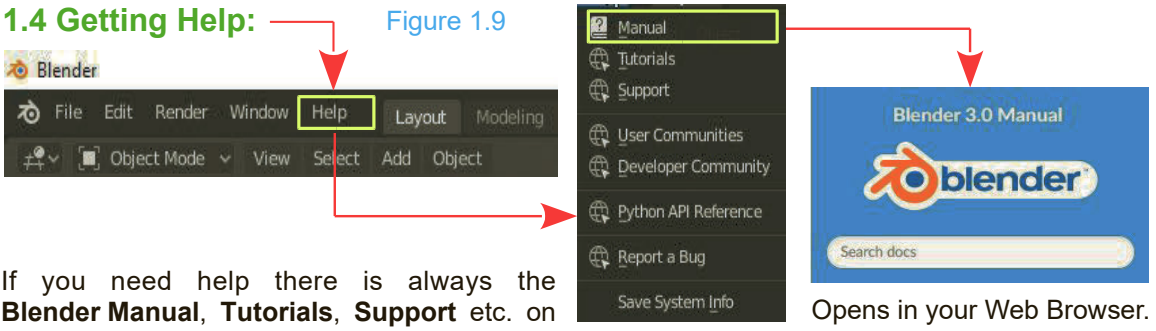
Figure 1.8



This method opens a new default Blender Screen Arrangement.

1.4 Getting Help:

Figure 1.9



If you need help there is always the **Blender Manual**, **Tutorials**, **Support** etc. on the Internet.

Opens in your Web Browser.

1.5 Examine the Interface (Figure 1.1)

Figure 1.10

The **Blender Graphical User Interface** (GUI) is made up with four (4) Panels called **Editors** and three (3) **Headers**. In addition each **Editor Panel** also has its own Header which is usually at the top of the Panel. Headers contain icons and text notations which are buttons for selecting or activating functions.

> Consider **Functions** as the computer code working behind the Scene which make things happen.

When Blender is first opened the Interface displays with the **Splash Screen** in the center of the display in the **3D Viewport Editor** Panel. As you may have discovered, clicking the left Mouse button cancels the Splash Screen leaving the Interface displaying the Blender **Interface Header** (Upper - the white strip across the top of the Screen), the Blender **Screen Header** (the black strip below the Interface Header), and the Blender **Interface Header – Lower** (the strip at the bottom of the Screen). Between the Headers are the four default Editor Panels; the main panel, the **3D Viewport Editor**, the **Outliner Editor** and the **Properties Editor** (at the right hand side of the Screen) and the **Timeline Editor** below the 3D Viewport Editor.

With the Splash Screen removed you see a gray **Cube** in the center of the 3D Viewport Editor.

The 3D Viewport Editor is showing the Cube, suspended in 3D (three dimensional) Space. For convenience the Space is provided with a horizontal **Mid Plane Grid** for reference when positioning Objects in Space. The Grid is marked with the Horizontal X Axis (red line) and the Horizontal Y Axis (green line). By default the Vertical Z Axis is not displayed.

In Blender, the **Cube** is said to be an **Object**. In the default Scene there is also a **Camera** Object and a **Lamp** Object. You see the Objects listed in the **Outliner Editor** (upper RHS of the Screen).

The Cube is one of several basic building blocks from which to commence modeling. The orange outline indicates that the Cube is **selected** which means you can work on it to create something.

By clicking **LMB** (left mouse button) with the **Mouse Cursor** over an empty part of the 3D Viewport Editor you will **deselect the Cube**. The orange outline disappears. To re-select the Cube or select another Object you place the Mouse Cursor over the Object and click **LMB**.

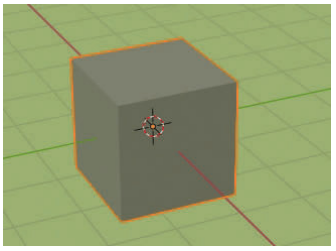
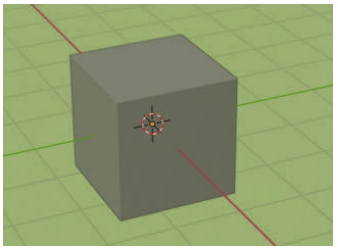


Figure 1.11



Cube Selected

Cube De-Selected

Note: In Figure 1.1 the background color of the 3D Viewport Editor has been changed from the default gray hiding the grid. You will be shown how to do this at a later stage (see Chapter 2 – 2.18). Header colors may vary, 3D Viewport and 3D View – Lamp and Light are synonymous.

Note: Default means, that which is displayed or occurs without any action being taken.

1.6 Rotating in the 3D Space

Rotating the Object (Cube)

In the default Scene, The Cube Object is located at the center of the 3D Space. **Have the Cube selected**. Place the Mouse Cursor, in the 3D Viewport Editor to one side of the Cube. Press the **R Key** (rotate) on the Keyboard and drag the Mouse to rotate the Cube. Click LMB to set in position.

Rotating the 3D Space (Viewport)

With the Mouse Cursor positioned in the 3D Viewport Editor, click and hold the **Middle Mouse Button** (Scroll Wheel) and drag the Mouse. The Scene in the 3D View Editor is rotated. Release the Mouse button.

This exercise has distinguished between rotating an Object and rotating the View which is advantageous when modeling. Of course you have messed up the View and may wish to get back to square one. At this stage the options are to restart Blender or restart without closing as described in Section 1.3. There are Keystrokes for rotating the View and Manipulation Widgets for rotating the Object or the View. These will be explained later (see 1.9 and Chapter 2 – 2.7).

1.7 Other Objects

Besides the Cube Object, the default Scene contains a Lamp Object and a Camera Object.

The Lamp represents a light source which illuminates the Scene, determining how you will see the View when it is converted into an Image (see Chapter 15).

The Camera determines what part of the Scene is captured for Rendering (Chapter 15 – 15.3).

The Lamp and the Camera have Properties which may be modified to produce effects. How to do this will be placed on hold for the time being.

There are many Object which you can add to the Scene. With one exception the Objects are not preconstructed models of characters but mesh shapes (Primitives) from which you begin modeling.

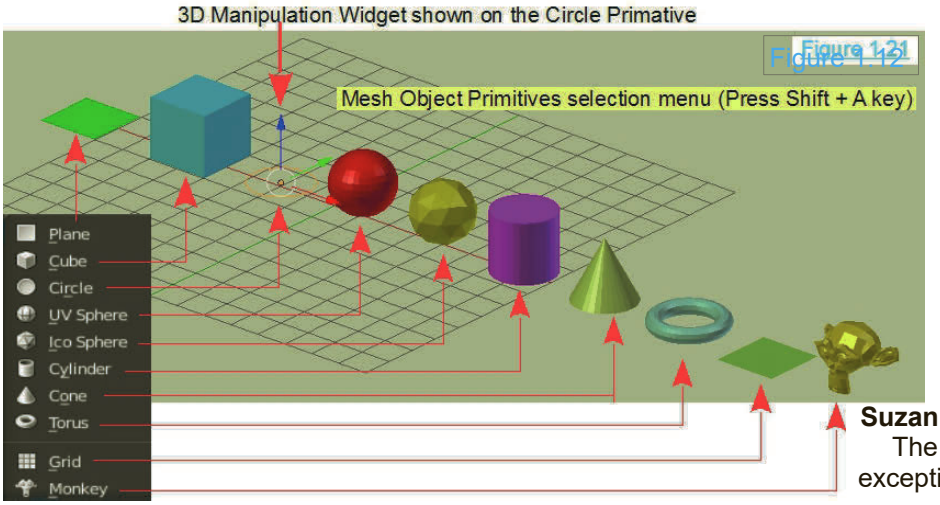


Figure 1.12

Suzanne The exception

To demonstrate adding an Object, the one exception, the preconstructed Mesh model of a Monkey, affectionately named **Suzanne**, will be added to the default Scene.

The basic principle in Blender, when modeling, is to add one of the basic Mesh Objects, sometimes called Primitives, then modify (model) that shape into whatever you want. You may combine several primitives if you wish.

To Add a new Object you either click the **Add button** in the 3D Viewport Editor Header or with the Mouse Cursor in the 3D Viewport Editor, press the **Shift Key + the A Key** (keyboard) to display the **Add Menu**.

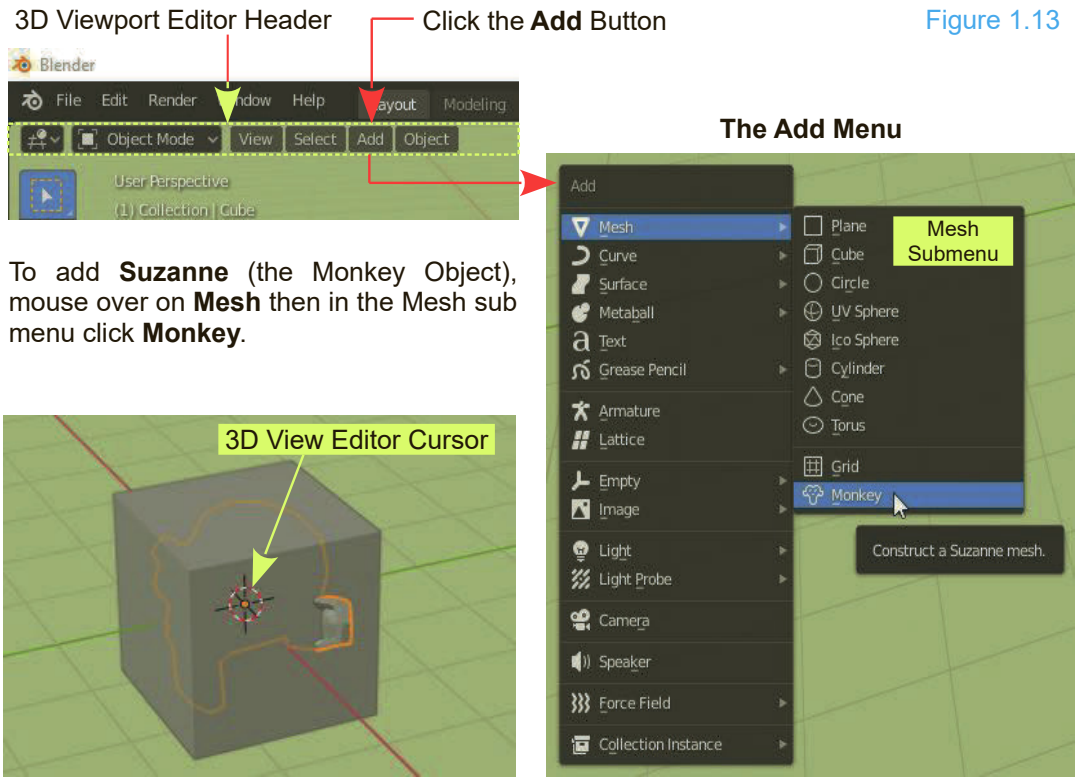


Figure 1.13

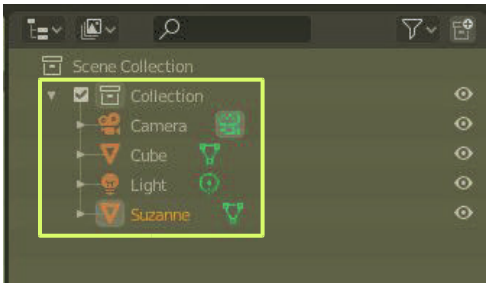
To add **Suzanne** (the Monkey Object), mouse over on **Mesh** then in the Mesh sub menu click **Monkey**.

All New Objects added into a Scene are entered at the position of the **3D Viewport Editor Cursor**. **Yes! There is another Cursor**. By default the 3D Viewport Editor Cursor is located at the center of the 3D Space. The default Cube Object is also located at the same position and when Suzanne (Monkey) is entered she is also located at this position.

When a new Object is added to the Scene, the new Object becomes the selected Object, hence you see the orange outline and in this particular case you see part of Suzanne's Ear protruding from the surface of the Cube. To see Suzanne clearly hide the Cube using the **Outliner Editor**.

1.8 Using the Outliner Editor

Figure 1.14



The **Outliner Editor** lists all the Objects in the Scene and provides a means of organising Objects into groups. This is a great help when compiling complicated Scenes.

In Figure 1.14 you see the Objects in the Scene listed in a group named **Collection**.

How to organise Collections will be explained in Chapter 12 but for the moment, click on **Cube**, then click on the little **Eye Icon** adjacent to Cube (Figure 1.15) to hide the Cube in the Scene. This does not delete the Cube, it merely cancels the display. You click the eye icon a second time to reinstate the Cube in the 3D Viewport Editor. If you click the eye icon adjacent to Collection the display of every Object in the Collection is cancelled.

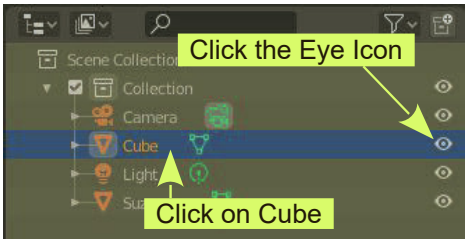
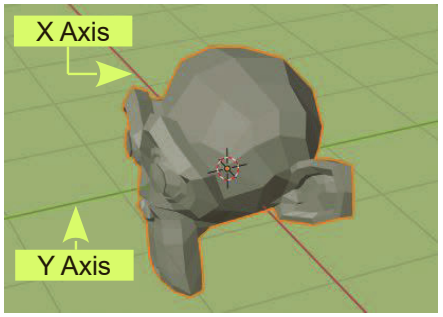


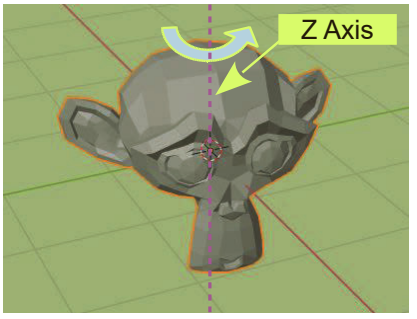
Figure 1.15

1.9 Working in the 3D Viewport Editor (Object Mode)



Suzanne with the Cube hidden

Figure 1.16



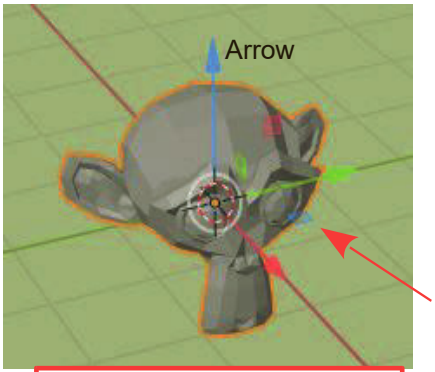
With Suzanne selected, press the **R Key + the Z Key** and drag the Mouse to see her pretty face.

Rotation: R Key + Z Key means, Rotate about the **Vertical Z Axis.**

There are many functions which can be employed in the 3D Viewport Editor. Rotating an Object is one. You also **Scale** the selected Object (Press the S Key and drag the Mouse) (S Key + X confines the Scale operation to the X Axis). You **Translate** (move and reposition) the Object in the 3D Viewport Editor (Press the G Key (G for Grab) and drag the Mouse) (G Key + Y confines the movement to the Y Axis).

The function of the Keystrokes are replicated by **Widgets** which are activated from the **Tool Panel in the 3D Viewport Editor**.

Figure 1.17



The **Move** (Translate) Widget

The colored **arrows** and **rectangles** are **Widget Control Handles** which you click (LMB), hold and drag to Translate (move) the selected Object in the Scene. Clicking an arrow confines the movement to an Axis in the Scene. Clicking a rectangles confines the movement to either the X,Y or Z Plane.

Widgets are explained in detail in Chapter 2 – 2.7, 2.14.

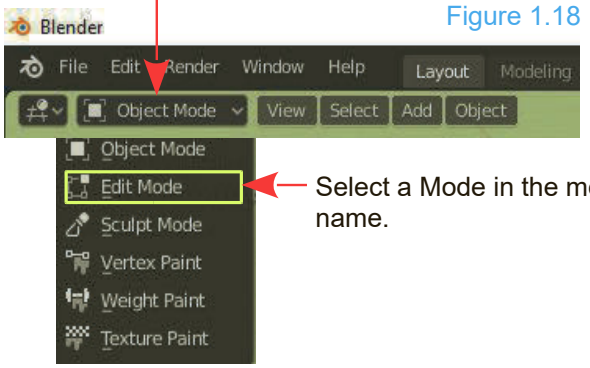
With the Cube hidden, using the Transform Widget, move Suzanne to one side of the center of the Scene, then in the Outliner Editor, click the eye icon adjacent to Cube to reinstate the display of the Cube in the 3D Viewport Editor.

1.10 3D Viewport Editor Modes

The 3D Viewport Editor can be displayed in different Modes depending on what operation is to be performed.

Note: Section 1.9 has been titled **Working in the 3D Viewport Editor (Object Mode)**. You change the Mode by clicking the **Mode Selection button** in the 3D Viewport Editor Header.

Figure 1.18

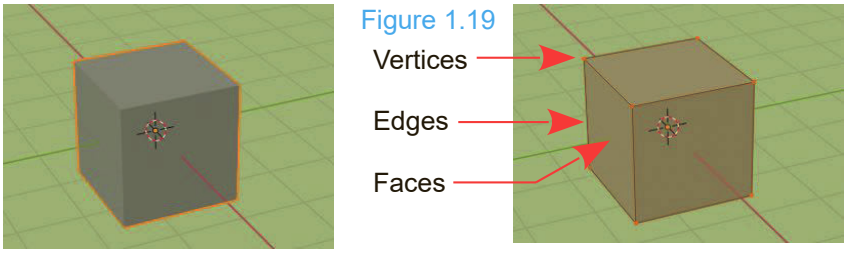


1.11 Working in the 3D Viewport Editor (Edit Mode)

Note: You will find there are many times when you want to switch between Object Mode and Edit Mode. Instead of using the Mode Selection Menu simply press the **Tab Key** on the Keyboard to **Toggle** between the two Modes (have the Object selected).

In **Edit Mode** the default Cube displays with its **Faces** a different shade of gray, with orange dots at each corner called **Vertices**, connected by thin orange lines which are the **Edges**.

Figure 1.19



Object Mode **Edit Mode**

When changing from Object Mode to Edit Mode all **Vertices**, **Edges** and **Faces** are selected.

Click **LMB** in the 3D Viewport Editor to deselect all the Vertices, Edges and Faces.

Note: In Edit Mode, the Mouse Cursor displays as a **white cross**  . Figure 1.20

Position the Mouse Cursor (white cross) over one of the Vertices and click LMB to select a single Vertex on the Cube (vertex turns white).

Note: Selection in 3D Viewport Editor, in Edit Mode, is by default, set to **Vertex Select.**

You change the **Selection Mode** in the 3D Viewport Editor Header.

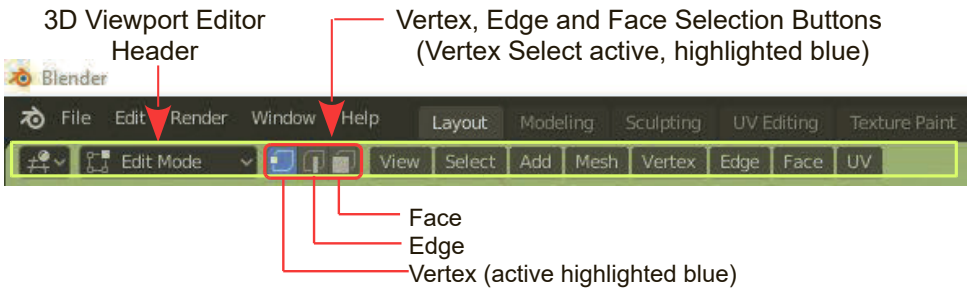


Figure 1.21

Note: When changing to Edit Mode the array of buttons in the 3D Viewport Editor Header is different to Object Mode and the options in the Tool Panel change. You are able to select a Vertex since the Vertex Select button in the Header is active (highlighted blue). You have the options to select Edges or Faces.

With the Vertex selected, press the **G Key** and drag the Mouse to reposition the Vertex. Click LMB to set in place.

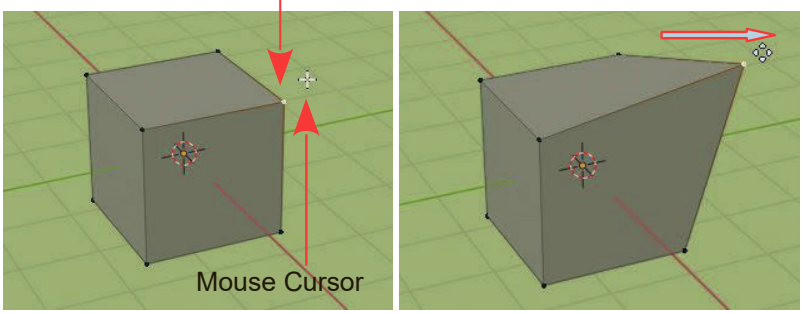


Figure 1.22

This simple rudimentary procedure is the basis of **Modeling**.

With the Vertex repositioned, Tab back to Object Mode.

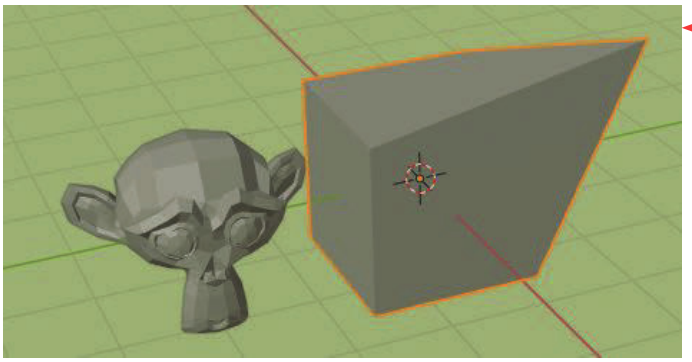


Figure 1.23

1.12 Coloring Using the Properties Editor

Bear in mind, the objective in this chapter is to familiarise you with the Graphical User Interface, not to explain all the functions available in Blender. You have been introduced to Editors and Headers and given a small insight into operating in 3D Space and working with Objects.

The **Properties Editor** contains controls which affect what happens in the 3D Viewport Editor. Some controls apply to the Scene as a whole and some specifically affect the properties of the Selected Object. There are usually multiple Objects in a Scene. The controls in the Properties Editor change when an Object is selected and affect only the Selected Object.

To demonstrate, it will be assumed, you have a Scene containing a Cube Object and a Monkey Object. In this case the Cube has been modified per the previous example (Figure 1.22) and Suzanne has been moved to the side (Figure 1.23).

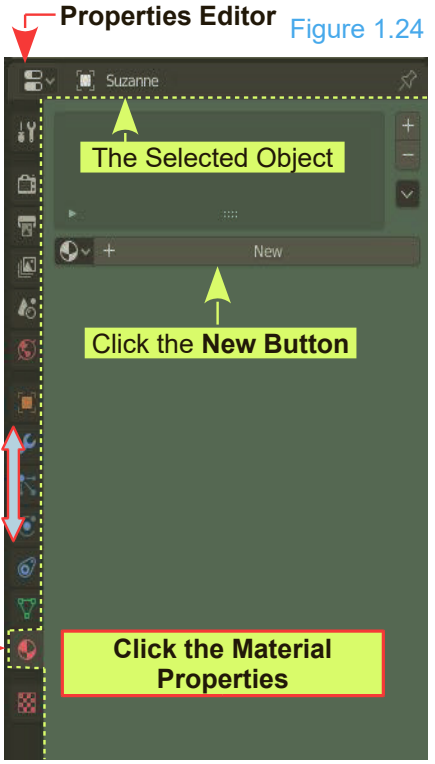


Figure 1.24

The Properties Editor will be used to add a color to Susanne.

With Suzanne selected, click on the **Material Properties** button at the left hand side of the **Properties Editor** (Figure 1.24).

Remember, Monkey is called **Suzanne**. With Suzanne selected the Material button controls only affect Suzanne.

The Material button controls for Suzanne at this stage consist of the single **New Button**. This is telling you that Suzanne has no Material applied. At this point consider **Material** to mean **Color**.

The vertical array of buttons at the left hand side of the Properties Editor will be explained in due course but for the moment only be concerned with coloring Suzanne.

Why Color?
Color adds a new dimension to a Scene. Objects become more interesting and color in a Scene creates atmosphere which enhances the story or message being told.

When constructing a Scene you should consider having a plan in mind. In the following demonstration the plan will be to have Suzanne appear blue with cold, sitting somewhere in the background. The deformed Cube will be set on fire. Suzanne will move forward, changing color as she warms up. Having Susanne colored makes the Scene a little more interesting. Besides, it introduces coloring controls and demonstrates the interrelation between the 3D Viewport Editor and the Properties Editor.

This demonstration will be a very simple unsophisticated example of animation which will give a preview of a physical simulation (Fire and Smoke).

To add **Material** (color) to Suzanne (the selected Object) click the **New Button** in the Properties Editor. The display expands (Figure 1.25).

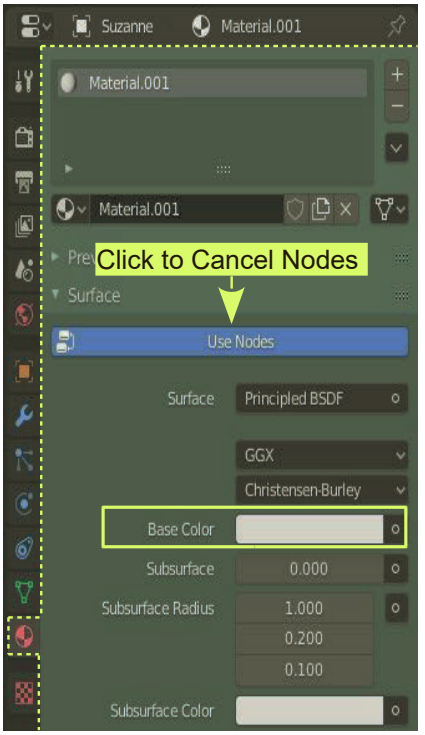


Figure 1.25

By default, Material Color is being controlled by a hidden **Node System**. The blue bar with the notation **Use Nodes** indicates that the Node System is in control.

Nodes are explained in Chapter16, but for the moment click on the blue **Use Nodes** button to **cancel the Node System**.

With the Node System cancelled the Properties Editor, Material buttons display with a reduced number of functions (Figure 1.26 **Note:** diagrams are curtailed to save page space).

Remember the Material Properties button controls only apply to the selected Object in the 3D Viewport Editor, in this case Suzanne.

To turn Suzanne blue, click on the white **Base Color** bar to display a **Color Picker**. The Color Picker gives the options to select one of three color schemes; **RGB**, **HSV** or **Hex**. By default the HSV color scheme is selected. Click on the **RGB** button to change the color scheme to RGB (**R**ed, **G**reen, **B**lue).

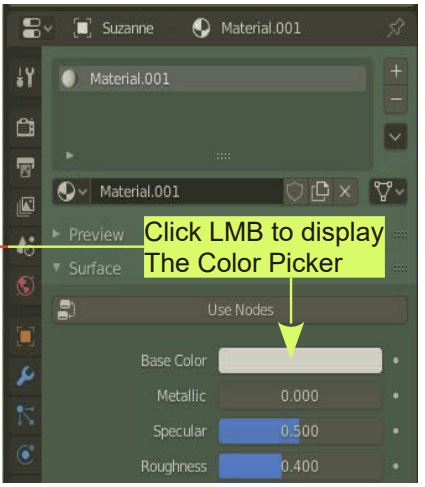
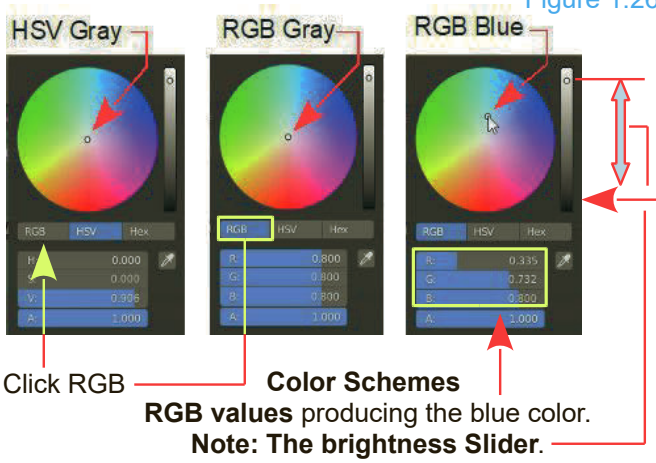


Figure 1.26



When you add a Color to an Object the RGB values are by default, R: 0.800, G: 0.800, B: 0.800 and A: 1.000. The RGB values generate the Blender default gray color, while the A (Alpha) value sets the transparency of the color (A: 1.000 = Opaque, A: 0.000 = Fully Transparent).

To make Suzanne blue in the face, click LMB in the RGB Color Picker Circle where it displays blue. To select the exact blue shown in the diagrams you may double click on a numeric value (displays a typing cursor) hit delete or backspace and retype a new value (Figure 1.27 opposite).

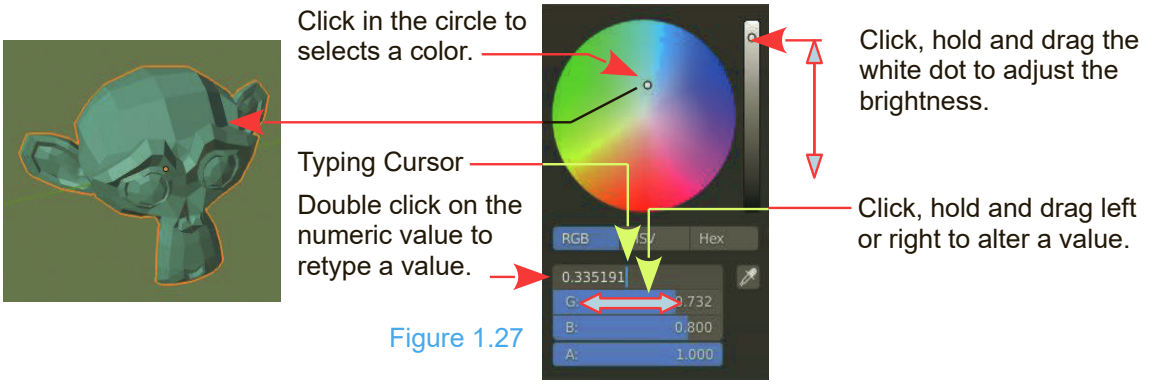


Figure 1.27

When you select a color in the circle or alter the numeric values, the color of the selected Object changes. **Note:** This is a basic procedure demonstrating the application of Material color prior to understanding **Viewport Shading Modes** and **Material Nodes** (see Chapter 14 and 16).

Suzanne is now shivering and blue in the face. Move Suzanne towards the back of the Scene. To warm Susanne up start a fire.

1.13 Fire - Quick Method Example

Blender allows you to create effects from first principles. This applies to modeling and creating physical effects. There are several Quick effects one of which is a method for creating a fire effect. Make note this is a **Quick Method** which has a limited application. You will be instructed in how to generate this effect from first principles later on and when you understand the procedures the results are limitless.

To start a fire you need something to burn so let's set the Cube that has been modified alight.

Deselect Suzanne and select the modified Cube Object. You may use the default Cube.

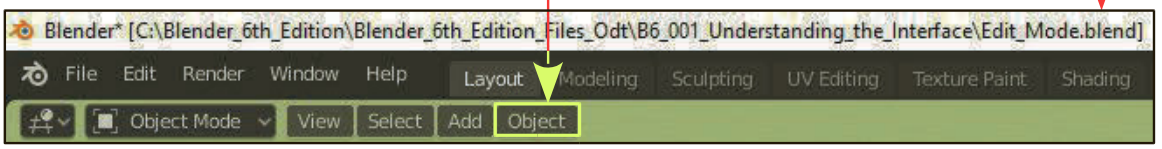
Note: The Cube doesn't have to be modified and you can use any Mesh Object. If you have been following along, the modified Cube will already be in the Scene, therefore, its convenient to use for the demonstration.

Note: In Figure 1.28 the Header shows the File Path to a Blender File named **Edit_Mode.blend** that has been saved.

How to name and save files and navigate the file directory will is explained in Chapter 3.

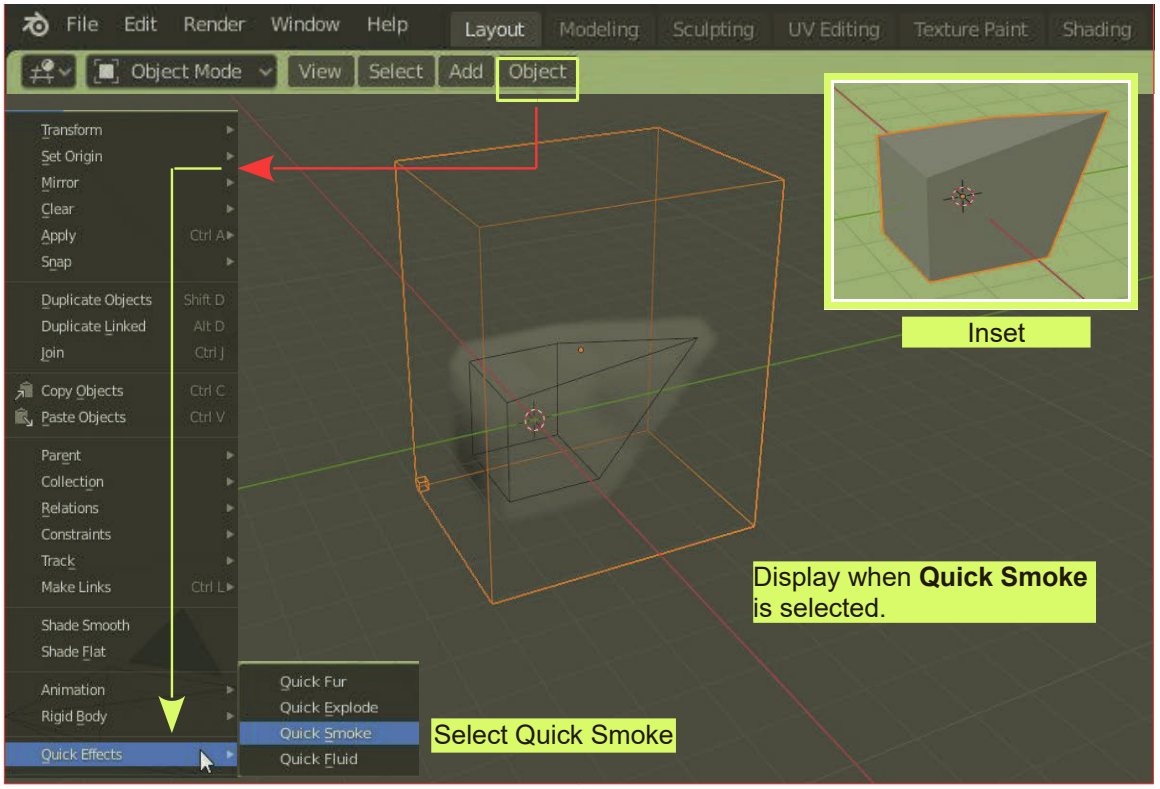
With the Cube selected click on the **Object button** in the 3D Viewport Editor Header.

Figure 1.28



Clicking the Object button displays a selection menu. Towards the bottom of the menu, click **Quick Effects** and in the sub menu select **Quick Smoke**.

Figure 1.29



When you click on **Quick Smoke** the display of the modified Cube changes to that shown in Figure 1.29. **DO NOT CLICK in the 3D Viewport Editor**. **Note** the **Quick Smoke button** in the lower left hand corner of the 3D Viewport Editor (Figure 1.30). The inset in the upper right hand corner of Figure 1.29 show the Cube before clicking Quick Smoke.

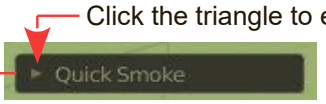
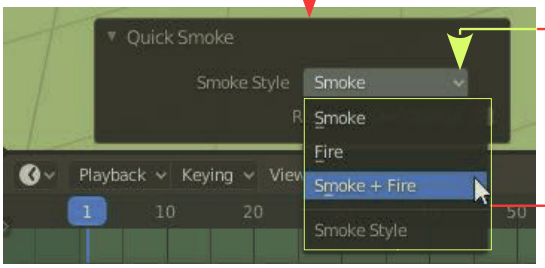


Figure 1.30



In the new display click the **arrow** to open a sub menu and select **Smoke + Fire**.

Note: Wait a few second to load.

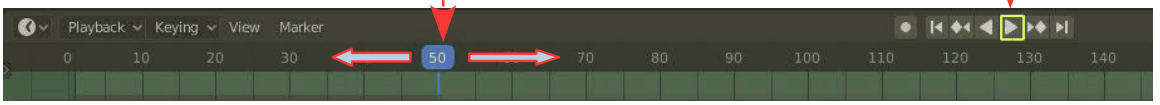
Figure 1.31

The foregoing set up a **Smoke + Fire Simulation** (see Chapter 25 – 25.11). In the **Timeline Editor** (Figure 1.32), click the **Play** button to see smoke and fire billowing from the Cube (Figure 1.33, **Note:** The 3D Viewport Editor in the default **Solid Viewport Shading Mode** (see Chapter 14).

Animation Frame Numbers

Figure 1.32

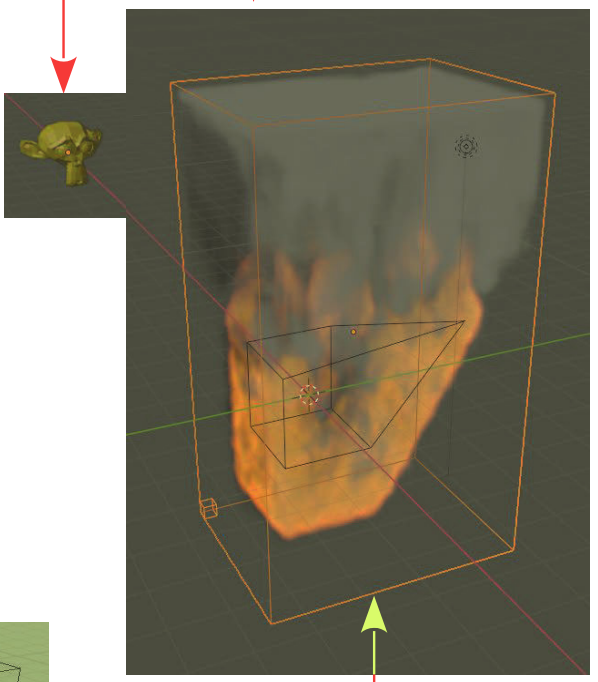
Click the Play button



The Animation stopped at Frame Number 50

Suzanne moved back in the Scene

Figure 1.33

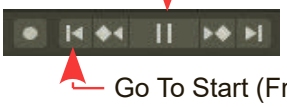


Clicking the **Play** button in the **Timeline Editor** generates an Animation Sequence. When generating the animation is very slow and jerky.

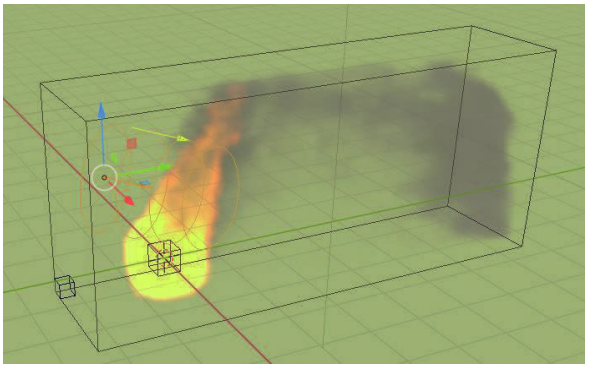
The default animation length is 250 Frames as seen by the **End Frame** number below the Header. When the Animation reaches Frame 250 it automatically replays. The replay is much smoother.

The buttons adjacent to the Play button are similar to the buttons you will find on any audio or video playing device. When Play is pressed the button changes to the **Stop button**.

Figure 1.34



Go To Start (Frame 1)



By scaling the **Cube** down, reshaping the volume in which the simulation takes place and adding a Force Field the smoke and fire can be directed to suit the action intended in a Scene (see Chapter 25 – 25.11).

Figure 1.35

With the fire raging Suzanne's face is still blue with cold. It would be nice to invite her to come close to the warmth.

1.14 Animation

There are many properties which can be Animated. To give you an example, Suzanne will move in towards the fire and warm up (change color).

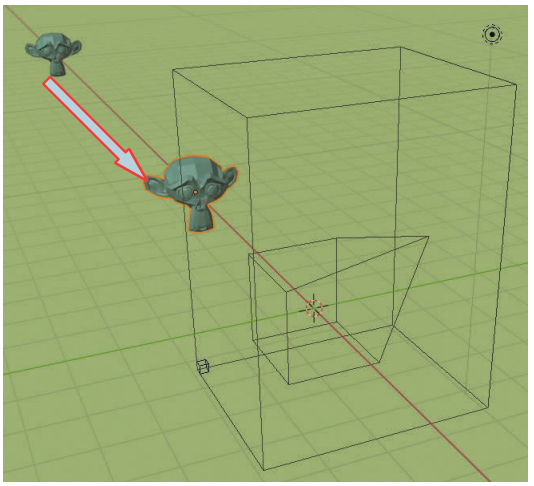


Figure 1.36

Select Suzanne in the 3D Viewport Editor. In the Timeline Editor, have the Timeline Cursor (blue line) at Frame 1 (Press the Go to Start button). The smoke disappears.

With Suzanne selected and the Mouse Cursor in the **3D Viewport Editor**, press the **I Key**. In the menu that displays select **Location**.

In the Timeline Editor click on Frame 60 moving the Timeline Cursor to Frame 60 (smoke reappears).

Press the **G Key + X Key** and drag the Mouse moving Susanne in towards the Cube along the X Axis. With the Mouse Cursor in the 3D Viewport Editor, press the **I Key** for the Insert Keyframe menu and select **Location**.

When the Animation is replayed the fire starts and Suzanne moves close to the the heat but she doesn't appear to warm up. She still looks pretty blue. Return the Animation to Frame 1 and head over to the **Properties Editor**.

Have **Suzanne selected** at Frame 1 in the Animation Sequence. Have the **Material Properties** selected in the Properties Editor **with Use Nodes cancelled**. **Right Click** on the blue Base Color bar and click on **Insert Keyframe** in the menu that displays.

Click on Frame 60 in the Timeline Editor. Click **LMB** on the blue Base Color bar and select a nice rosy red hue in the color picker.

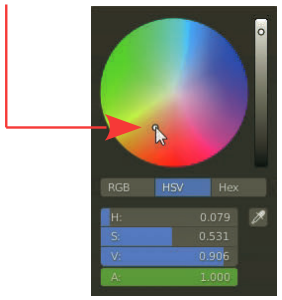
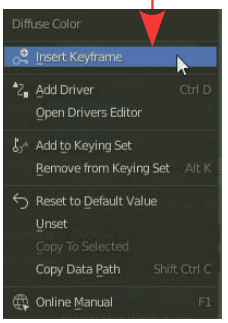
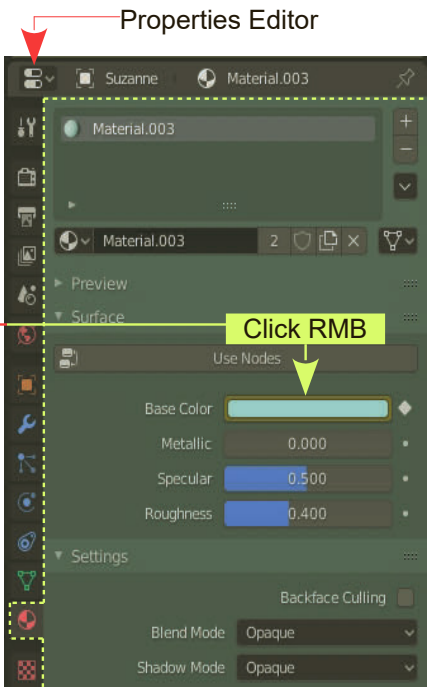


Figure 1.37





Click **RMB** on the rosy red **Base Color bar** and select **Insert Keyframe**.

Playing the Animation shows the Fire burning with Suzanne moving in towards the warmth changing from cold blue to warm red.

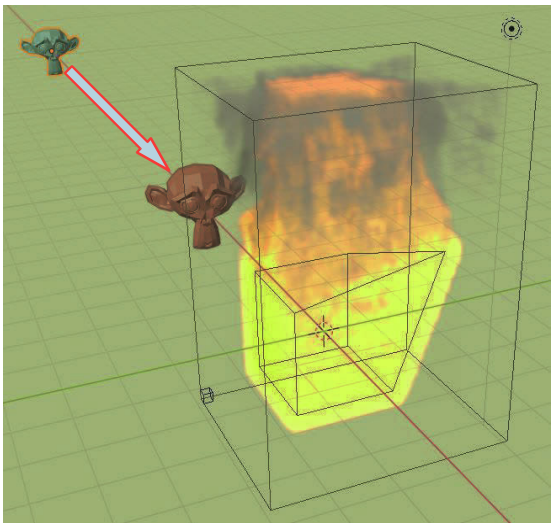


Figure 1.38

This has demonstrated only two properties which may be animated. A more detailed discussion is found in Chapter 20.

1.15 Summary

The forgoing is intended to familiarise you with the Graphical User Interface and demonstrate a few of the operational features of Blender. Understanding the Interface and how the Editors relate to one and other is a start to understanding how Blender works.

This has been a brief introduction. There are many features to be discovered, therefore the following chapters will expand on what has been covered and show where Blender Tools are located and give examples on how to use the Tools.

Before moving on to the other Chapters there are two more items you should be aware of.

Undoing: When you perform successive operations in creating a Scene you can backtrack through the sequence of operations, undoing each operation. By default undo operations are limited to 32 steps. To undo an operation press **Ctrl + Z Key**. This applies to any Editor.

Deleting: Deleting means, removing an Object and all its Properties from a Scene. To delete an Object, select the Object and press the **X Key**, click **Delete**. This applies only to the 3D Viewport Editor.

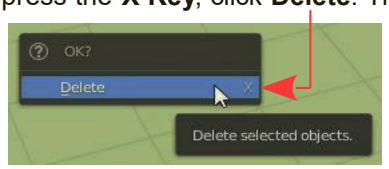


Figure 1.39

2

Editors – Workspaces - Themes

Editors – Workspaces - Themes

Editors are the individual windows or panels which make up the Blender Interface. They contain the controls for editing data. Everything initially displayed in the 3D Viewport Editor (Window) is generated by a set of default data which you modify using the controls in the various Editors.

Workspaces are the arrangement of Editors in the **Graphical User Interface** (GUI). The Blender **GUI** opens with four separate Editors displayed. This arrangement constitutes a **Workspace** (working space) where you arrange models and characters and create Scenes. The default Workspace is called the **General** Workspace. There are alternative pre-constructed Workspaces available and you may configure your own.

Themes are how the Graphical User Interface displays as a whole and are purely cosmetic. Blender has several Themes for selection. You can create your own or download custom builds from the Internet.

You may re size the Editor Panels, divide the Panels, creating additional Panels and change each Panel to a different type. In doing this you create a specialised Workspace which can be saved in a Blender file and reused. You can generate your personal Theme in a Blender file.

This chapter will introduce the controls for each of the above which will allow you to configure Blender for your personal requirements.

2.1 Editor Types

The **Default** Screen arrangement comprises four individual panels or windows, as shown in Figure 1.1 in Chapter 1. The panels are called **Editors**.

The default Editors displayed are: The **3D Viewport Editor**, the **Outliner Editor,** the **Properties Editor** and the **Timeline Editor**. Each has an icon representing the **Editor Type** in the upper left hand corner of the panel. Clicking LMB on this icon displays a menu for changing the Editor to a different Editor Type.

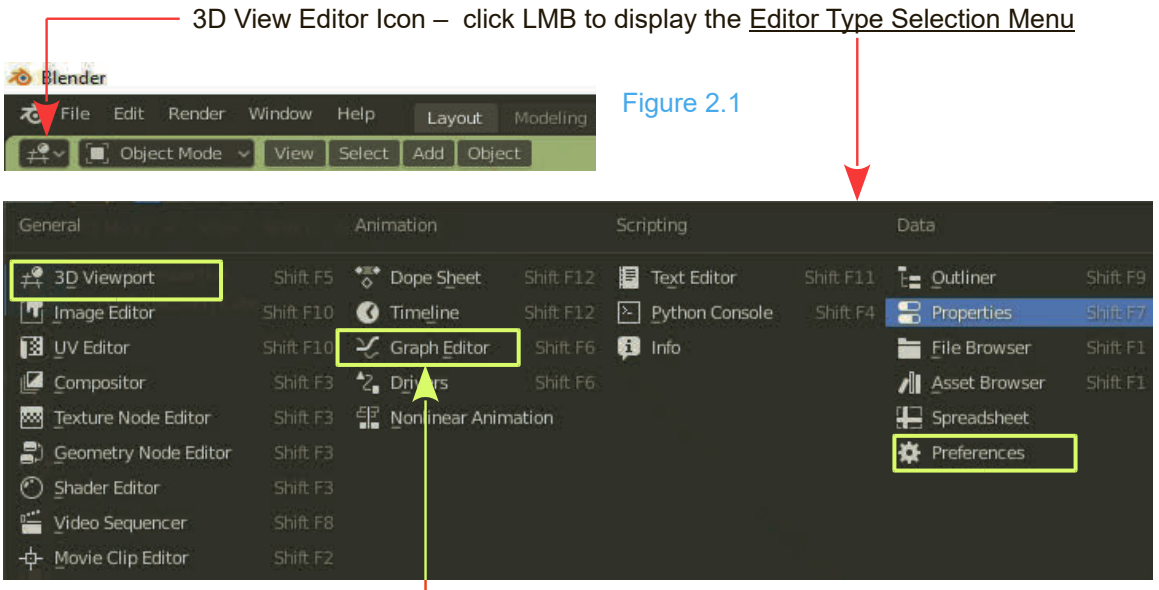


Figure 2.1

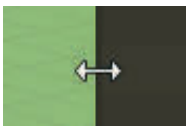
In the Editor Type menu, select (click) one of the Editors and the current Editor changes to that selected.

Here's an example; In the upper LH (Left hand) corner of the **3D Viewport Editor**, position the mouse cursor over the **Editor Icon** and click the left mouse button to display the Editor Type selection menu. Select (click on), **Graph Editor**, in the menu and the 3D Viewport Editor changes to the **Graph Editor**. In the upper left corner of this Editor click on the **Graph Editor** icon and select **3D Viewport** in the menu. The Graph Editor reverts to the 3D Viewport Editor. Any Editor may be changed to a different Editor type in this way.

Note: Make a note of the **Preferences Editor** in the selection menu.

2.2 Resizing Editors

Figure 2.2

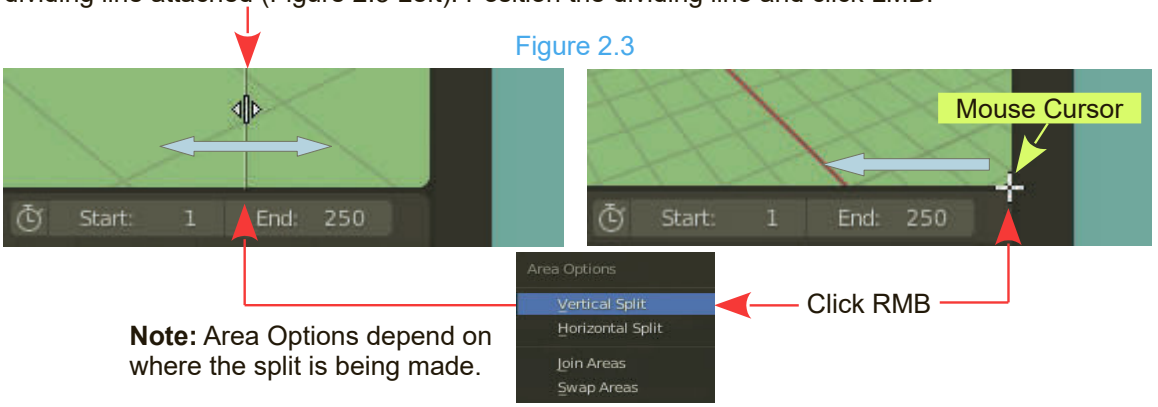


Most Editors and panels may be resized. Place the mouse cursor on an Editor or panel border and it changes to a double headed arrow (Figure 2.2). Click and hold the LH Mouse button and drag the arrow to resize the Editor panel. This works on both horizontal and vertical borders.

2.3 Splitting Editors

Editors may be divided, to initially form a duplicate, then changed to a different Editor Type. When the mouse cursor is placed in the corner of an Editor panel it changes to a **white cross** Figure 2.3 Right). Click **RMB** and select a **Split Area** option in the menu that displays. Drag the Mouse **horizontally or vertically** into the Editor to be divided. The Mouse Cursor changes with a dividing line attached (Figure 2.3 Left). Position the dividing line and click LMB.

Figure 2.3



Note: Area Options depend on where the split is being made.

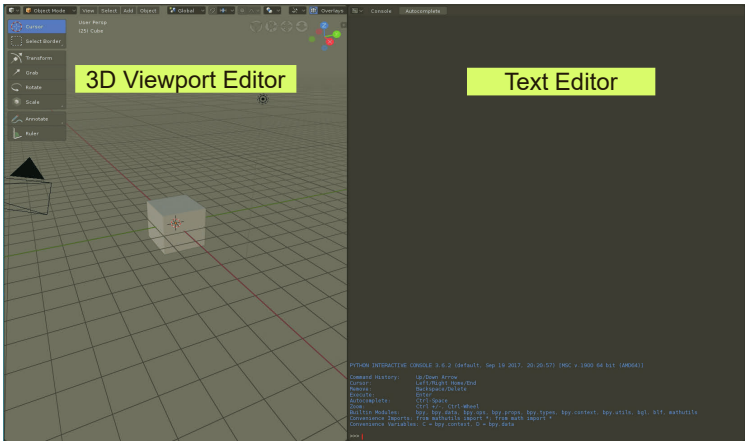
Alternatively, to split an Editor, mouse over in the corner of an Editor panel (mouse icon becomes a cross), LMB click, hold and drag the Cursor into the Editor to be divided.

If you make a mistake with the Split direction (Vertical – Horizontal) press **Esc** before releasing the Mouse button.

Alternatively, where **View** displays in a **Header**, click **View** then select **Area** (at the bottom of the menu that displays) then choose Horizontal or Vertical Split. Position the line that displays where you want the split to be then click LMB.

With an Editor split in two, one copy may be changed to another Editor Type (Figure 2.4).

Figure 2.4



Note: Henceforth the **3D Viewport Editor** may be abbreviated to the **3D Viewport**

2.4 Cancel an Editor

To cancel or join an Editor panel, position the Mouse cursor in the Editor corner (cursor becomes a cross). Click RMB and select **Join Area** in the menu that displays (Figure 2.5). The Mouse Cursor becomes a chevron. Drag the chevron into unwanted Editor. The Editor darkens (Figure 2.6). Click LMB to cancel the unwanted Editor.

Figure 2.5

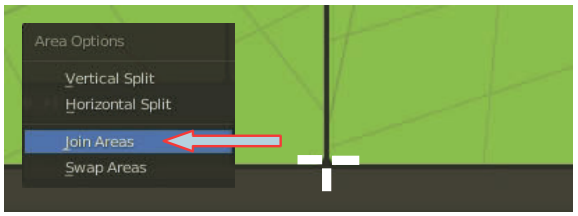
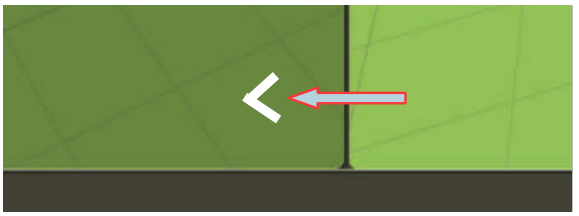


Figure 2.6

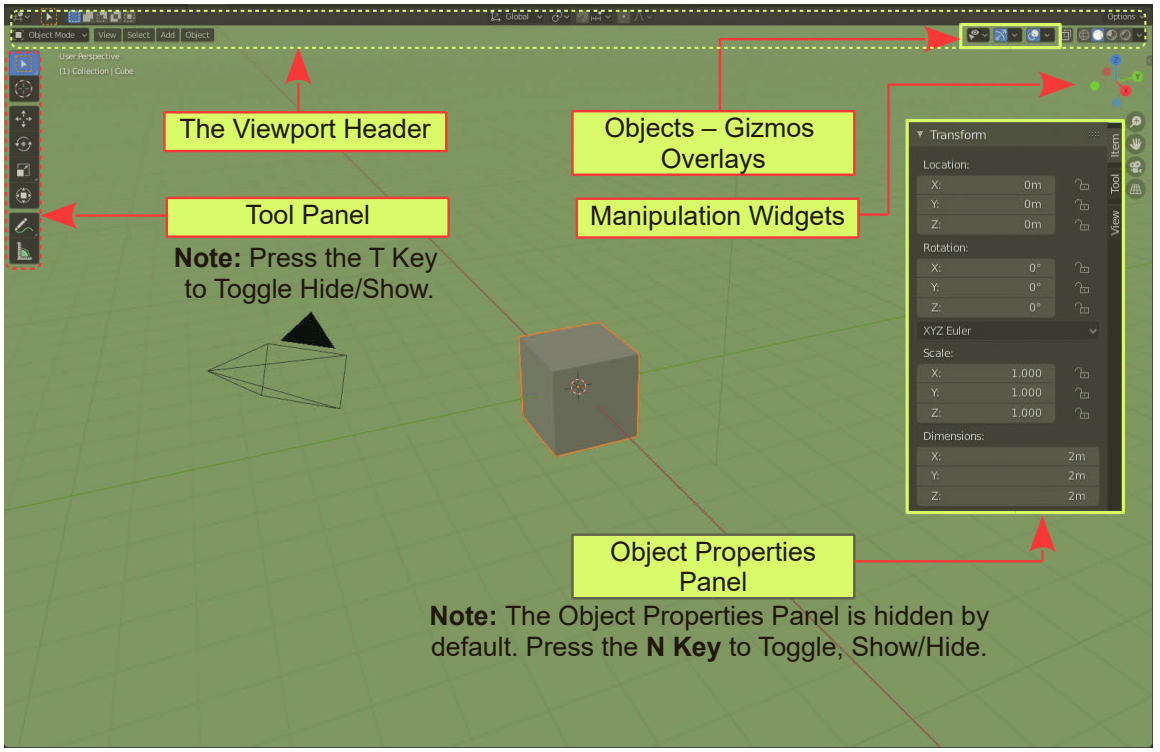


Note: While holding LMB with the chevron displayed you may reverse the direction from one Editor to the other. If you drag to the wrong Editor the Cursor displays as a No Go Signal:

2.5 3D Viewport Features

Figure 2.7 shows the main features included in the **3D Viewport Editor** display.

Figure 2.7

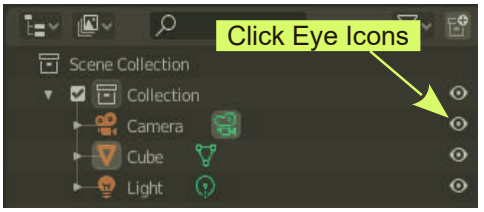


Uncluttering the Scene

When a Scene becomes complicated it can be advantageous to turn off displays such as the User Perspective and Object notification in the upper left hand corner of the 3D Viewport or the Scene manipulation Widget at the right hand side or perhaps the background grid in the 3D Viewport panel.

Figure 2.8

As described in Chapter 1 – 1.8 some of the display in the 3D Viewport may be controlled in the **Outliner Editor** by clicking the eye icons adjacent to the entries.



Hiding and showing displays here applies to Objects in the 3D Viewport.

Other displays are controlled by **Object Type**, **Gizmos** and **Overlays** from the 3D Viewport Header (Figure 2.9).

Figure 2.9

Click to Display

View Object Type

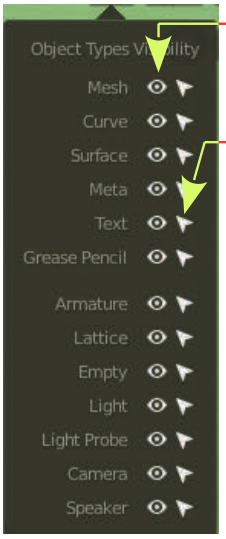
Gizmos

Overlays

Viewport Shading Modes (see Chapter 14)

Figure 2.10

View Object Type



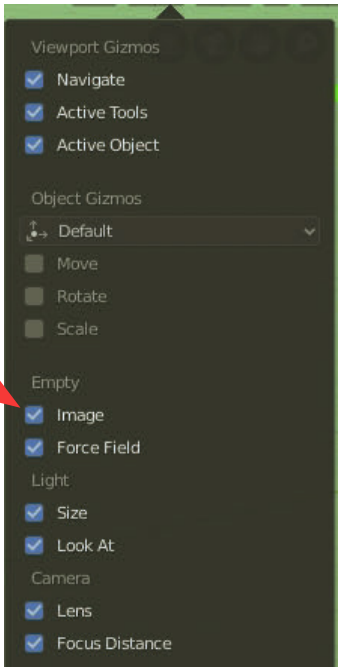
Click an Eye Icon to Hide/Show an Object Type.

Click a Cursor Icon to toggle Cursor Selection in the 3D Viewport Editor.

Check/Uncheck Gizmos to Activate/Deactivate functions.

Figure 2.11

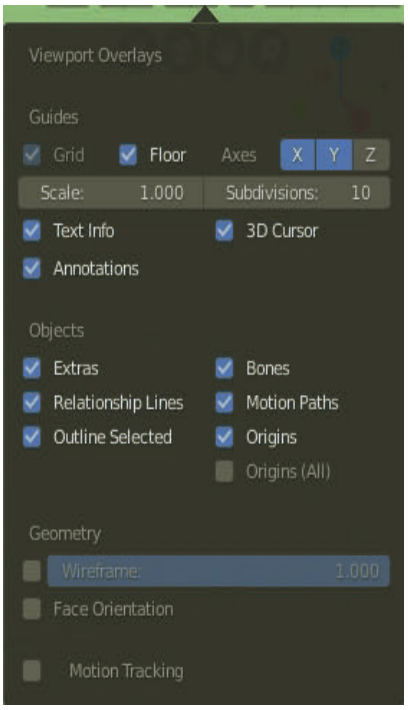
Viewport Gizmos

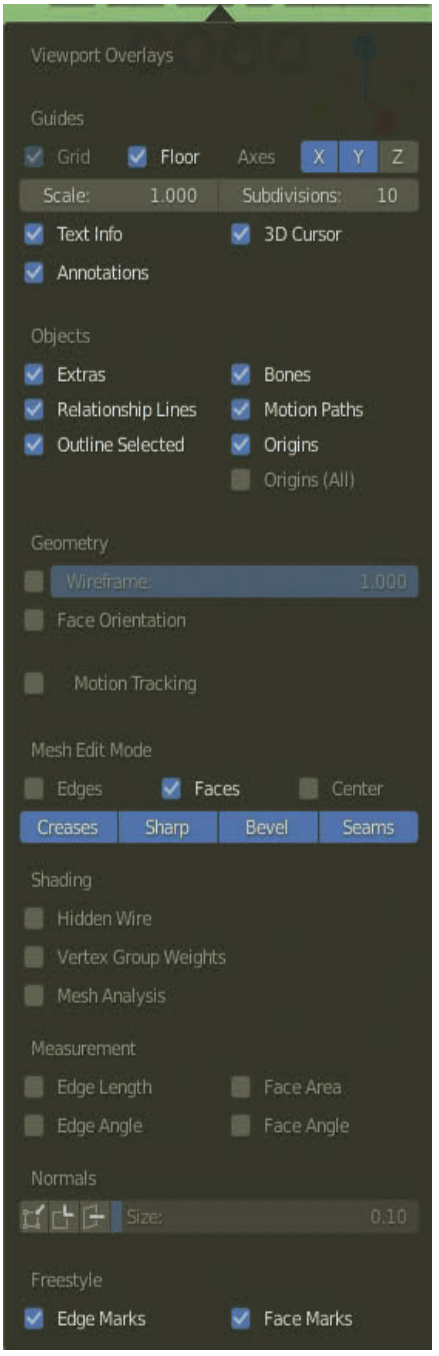


Overlays: control what displays in the 3D Viewport.

Note: The Overlay selection is different in Object Mode and Edit Mode (Figure 2.12 over).

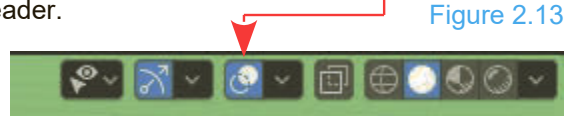
Object Mode Overlays Figure 2.12 **Edit Mode Overlays**





Note: The 3D Viewport has several different Modes. Overlays are only relevant to Object Mode and Edit Mode. You switch between the Modes by clicking on the Object Mode button in the 3D Viewport Header and selecting Edit Mode or vice verse. You may also toggle between Object and Edit Modes by pressing the **Tab Key**.

You set **Overlay** preferences in the relevant Overlay panels. The preferences are then toggled on / off by clicking the **Toggle Button** in the Header. Figure 2.13



e.g. With **Floor** checked in Object Mode, clicking the Toggle button Hides and Shows the Grid Floor.

2.6 Scene Manipulation

Before adding new Objects and creating a Scene you should be conversant with how the 3D Viewport may be viewed and how to move in the three dimensional world.

Moving in 3D Space

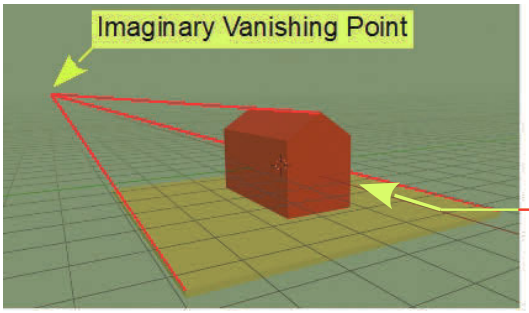
In a 3D (Three Dimensional) program, not only do you have to consider where you are in two dimensions (height and width), but you also need to consider depth (how close or far away).

Moving around in the 3D Viewport is controlled by the Mouse and the Keyboard Number Pad.

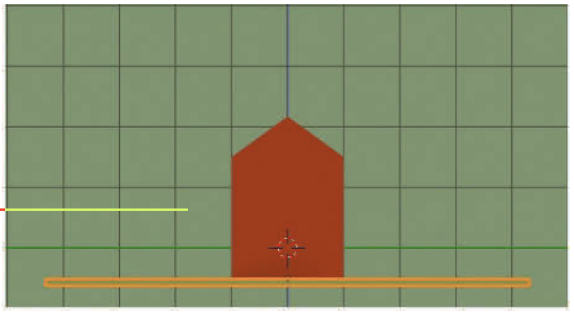
User Perspective and Orthographic View

The Blender default Scene in the 3D Viewport, opens in the **User Perspective** view as indicated in the upper LH corner of the Editor. The Scene contains a Cube Object located at the center. There is also a Camera and a Light in the Scene. All three Objects are positioned relative to the center of the Scene which is the center of the 3D World, or if you like, a central point in 3D Space.

The Blender Scene may be viewed in either **Perspective** or **Orthographic** view.



Perspective View Figure 2.14



Orthographic View View Figure 2.15

A **Perspective View** projects parallel lines to a single vanishing point somewhere in the distance. In landscape drawing this will be on the horizon.

An **Orthographic View** is seen looking square on (90º) to a Face.

The position of Objects relative to each other is important when considering 3D Space especially with Lights (lighting) and the Camera (seeing). When taking a photograph with a camera the position of the camera relative to what you want to photograph and where the lighting is located determine what you get in your snapshot. This is the same in a Blender Scene.

By default the Camera in the default Scene is positioned such that it points towards the Cube and with the default settings, for the Camera, captures an image of the Cube in its viewport. This is the image that will render (convert what the Camera sees to an image). To understand this, perform the following demonstration.