

GAMEDRAW

MODELING IN UNITY COMES TO LIFE

A Product by Mixed Dimensions |



Table of Contents

WHAT IS GAMEDRAW?	3
HOW TO INSTALL?	4
REQUIREMENTS	4
THE TOOLSET	4
GameDraw Inspector and Editor Window	4
Opening the Inspector version	5
Opening the Editor Window version	5
GameDraw window essentials	6
The copies bar	6
Loading a copy	7
Loading the original mesh	7
The save bar	7
Saving your list	7
Loading saved lists	7
Tabs	8
The General tab	8
The Edit tab	9
Edit Essentials	10
Multi selection	10
Editing vertices	10
Editing triangles	13
Boolean operations	19
The Optimization Tab	20
Optimize Tab	20
Importance of mesh decimation	21
Importance of mesh combine	21
Mesh combine vs Boolean union	21
Decimating a mesh	22
Mesh combine	23
Generate triangle strips	23
The UV tab	24
UV Editing Tab	24
Rotating UVs	24
Translating UVs	24
Scale UVs	25
Rotate 90	25
Flip X	25
Flip Y	26
Launching the UV Editor	26
UV mapping	27



The Create Tab	29
Create Tab	29
Primitives Tab	29
Sculpting Tab	43
The UV editor	51
Level painting	52
Enable/Disable Paint	52
The painter	53
Painting in the SceneView	53
Centering a mesh pivot	53
Splitting vertices	53
Combine meshes	54
Generate Lightmap UVs	54
SUPPORT	54
Contacting the support	55
CONTACT US	55

What is GameDraw?

GameDraw is an intuitive modeling extension for Unity that will make it possible for you now to model, draw, edit and optimize 3D & 2D elements within Unity, Game draw is a just the tool you need to create 3D models and 2D element within Unity, GameDraw has also an optimizer that optimizes meshes, an image tracer and much more features as demonstrated in [this video link](#).





Figure(1) Screenshot of GameDraw in action

The purpose of game draw is to make the life of designers easier by giving them possibilities inside Unity itself and cutting down time and cost.

How to Install?

Once GameDraw is downloaded from the asset store you will need to import it into your project and once the import process is completed you will have 2 main things to notice:

- 1- A new menu titled “GameDraw”, this menu holds most of GameDraw functions
- 2- Whenever you select an object with a MeshFilter you will notice a “**Disable GameDraw**” toggle that can be used to activate GameDraw in the inspector.

Requirements

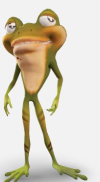
GameDraw does not require you anything but a Unity installation whether it is the Free version or a Pro version you can use GameDraw, currently optimization is still Windows & Pro only but a port to support runtime on all platforms is taking place so it will start working with the Free version and on Mac as well plus the ability to use it within the builds however this is still a work in progress.

The Toolset

Once you install GameDraw you will get a big toolset to work with as listed below:

GameDraw Inspector and Editor Window

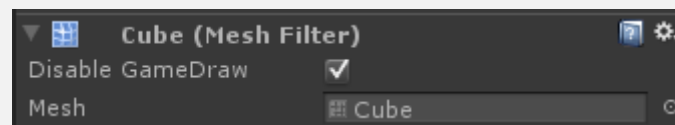
The main functions of GameDraw resides in the inspector and\or the editor window however the inspector version is more stable than the editor window version but both introduces the ability to do most of the tasks in GameDraw.



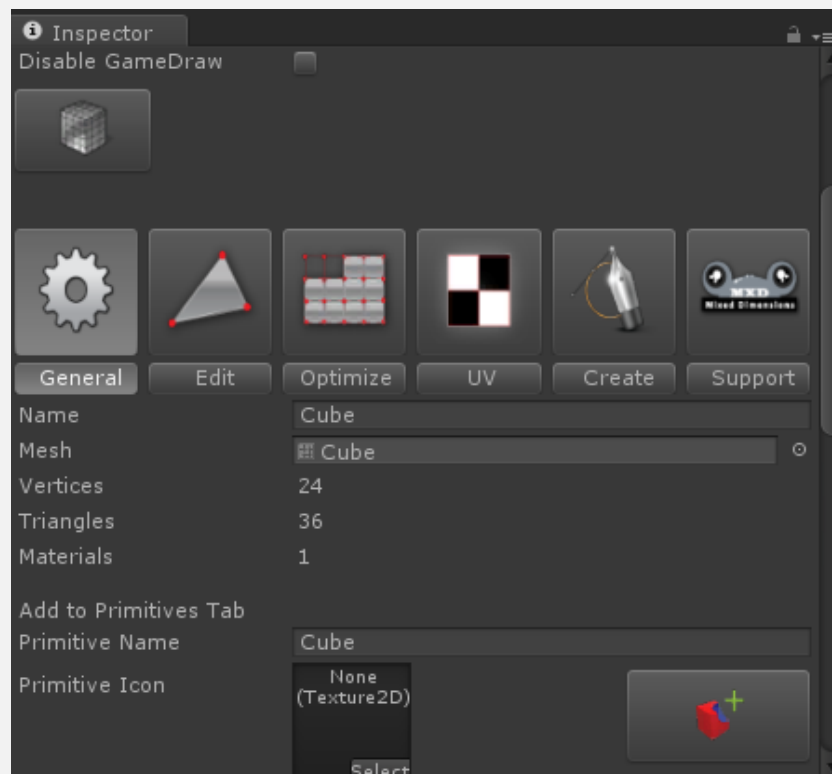
Opening the Inspector version

To open the inspector version you should do the following:

- 1- Select any GameObject with a meshfilter
- 2- If there is no mesh in the meshfilter you will get primitives other than that you will see "Disable GameDraw" toggle and the default meshfilter inspector.
- 3- In the inspector of the meshfilter untoggle "Disable GameDraw"
- 4- You should now get all of GameDraw tabs to show



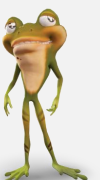
Figure(2) The MeshFilter Inspector with GameDraw disabled

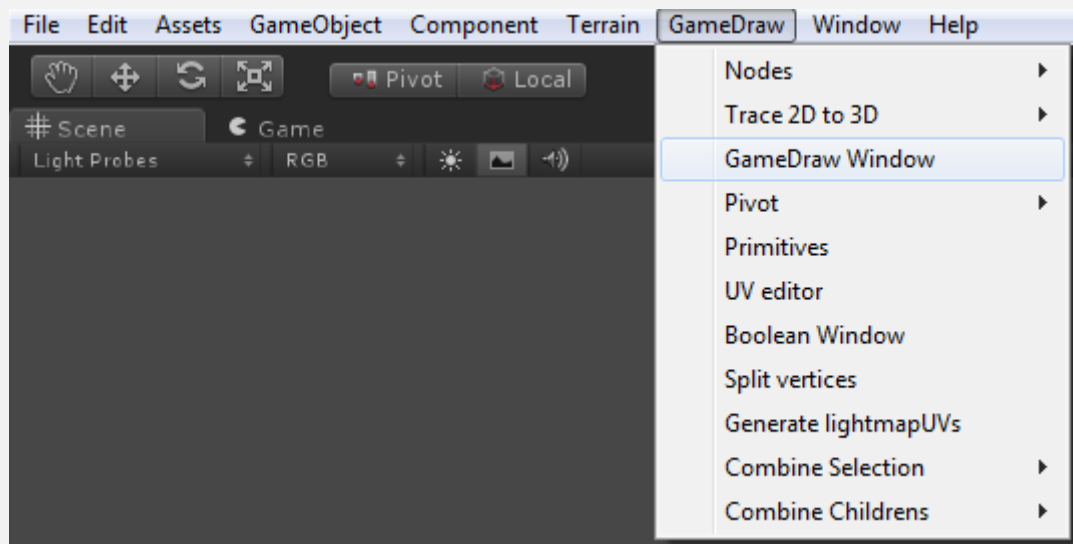


Figure(3) The MeshFilter Inspector with GameDraw enabled

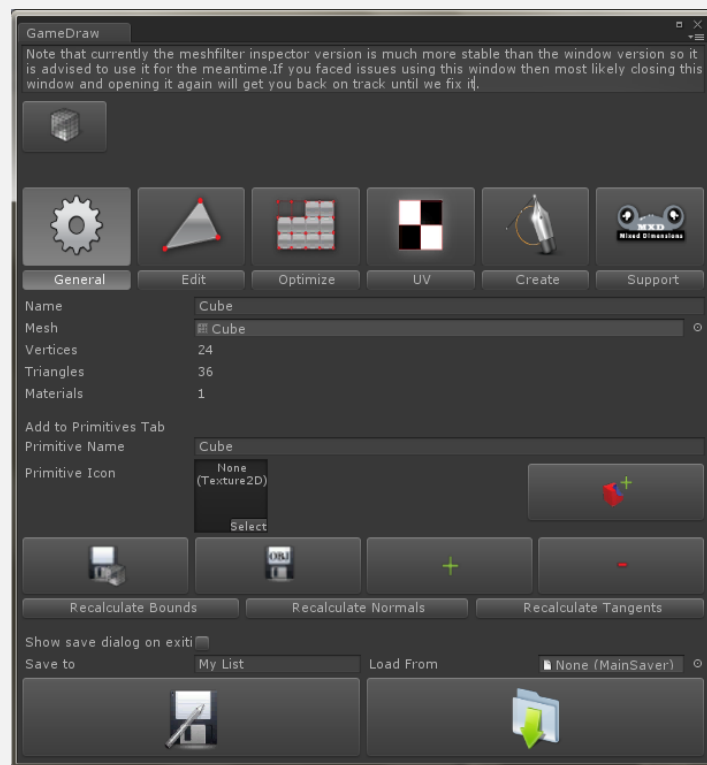
Opening the Editor Window version

From the main menu go to GameDraw-> GameDraw window and a new window should show up, if there is no selected GameObject with a meshfilter containing a mesh then you will get the primitives to show up once you select a GameObject with a mesh or you create a primitives then the window should show the GameDraw tabs.





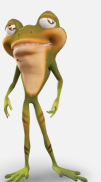
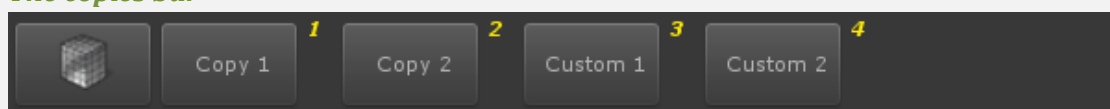
Figure(4) GameDraw menuitem



Figure(5) GameDraw editor window

GameDraw window essentials

The copies bar



When working with meshes it is very essential to create copies whether it is to provide multiple states of a model or to have LODs, this can be done easily with GameDraw and it guarantees that you will not lose your original mesh as it can't be modified directly but a copy can be created and modified this ensures that you will never lose any work you do.

When working it is possible to navigate between the copies by simply clicking on the button that reflects the copy you want to use, the first button is your original mesh so it is always possible to revert back to it, and the yellow numbering on top of each button introduces the copy number.

Loading a copy



To load a copy just click on the name of the copy you want to load.

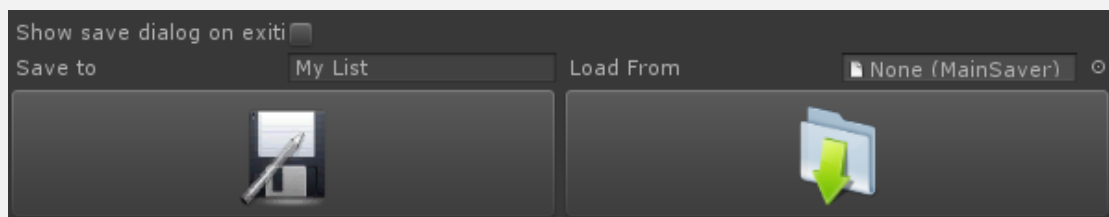
Loading the original mesh



To load the original mesh just click on the first button on the copy list

The save bar


The save bar is always visible in the bottom of GameDraw window or inspector; It allows you from saving your list of copies as a ScriptableObject and load it back later.



It is very important to ensure that you save any copy you want to keep from the general tab which will be explained later to ensure that it gets persistent on the hard disk and not be lost due to closing the editor or playing the scene, to ensure that you don't forget to do this we have added "show save dialog on exit" toggle that will always reminds you from saving your assets.

Saving your list


You can always save your list but you must first ensure that your meshes are persistent on the disk through saving them from the general tab which will be explained later however to

save your mesh list just set a name in the save to field, and click on the save button  once you do that a save dialog will appear asking you for the location to save your list into, select the location and click on save, now you will have your list saved as a .asset file holding its information and mesh references.

Loading saved lists

To load back a saved list all what you have to do is just to click on the "Load From" field and a selection window will pop up, select the asset that holds your list and then click on the



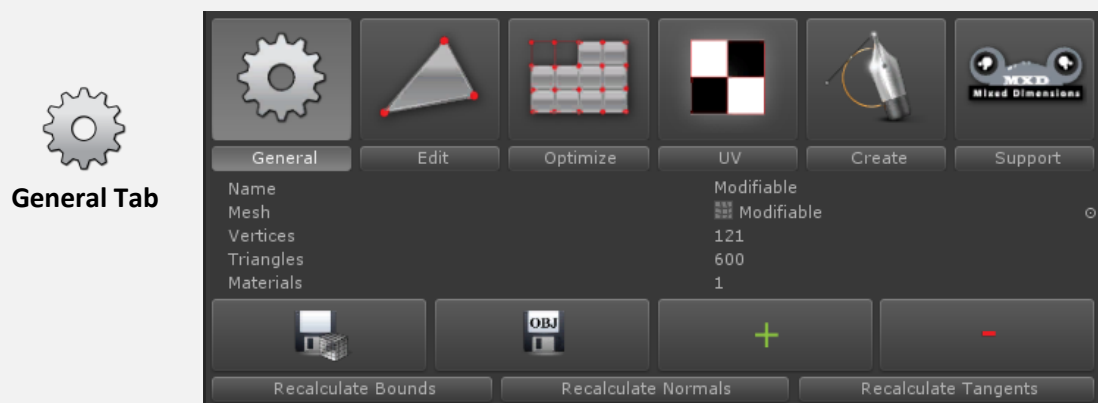
load button  now your list should be reloaded in the GameDraw window or inspector.

Tabs

GameDraw window comes with a set of tabs that is specialized for a purposes, the following demonstrates each tab and its usage:

The General tab

In the general tab you can do a set of important operations as well as get to know general information about the current mesh.



- Name** Holds the name of the current mesh and it is possible to modify it and set a new name
- Mesh** It holds a reference to a mesh, this can be used to change the references mesh for a slot in your list, to locate your mesh reference in your project or to check whether a mesh reference exists or not by clicking on it if the project hierarchy did not reference any object then this mesh is not persistent and should be saved.
- Vertices** The number of vertices for the current mesh
- Triangles** The number of triangles for the current mesh
- Materials** The number of sub materials the current mesh holds



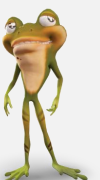
Click on this button to save the mesh as a **.asset**



Click on this button to save the mesh as a **.obj** to be used outside of unity or for some cases to get benefit from any functions the unity importer can apply into your mesh.



Click on this button to add a copy of the mesh to your copy list





Click on this button to remove the current copy from the list

Recalculate bounds

Click on this button to recalculates the bounds of the mesh

Recalculate normals

Click on this button to recalculates the normals of the mesh

Recalculate tangents

Click on this button to recalculates the tangents of the mesh

Primitive name

The name to be used one saving the current copy as a primitive in the primitives window as GameDraw allows you from adding custom models into the primitives list

Primitive icon

The icon to be used for the primitive that will be added to the primitives list



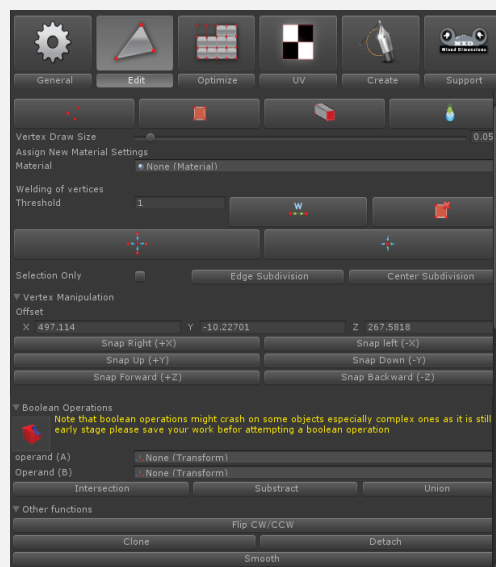
Once clicked this will add the current mesh as a primitive to the primitive list, the name and icon specified will be used for creating the primitive.

The Edit tab

The edit tab is considered the most important tab when working with meshes, it can be used to create complete meshes from primitives, modify existing models and even to project vertices from one mesh into the real world, for example projecting a house to fit the terrain.

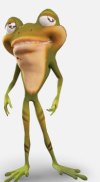


Edit Tab



IMPORTANT NOTE

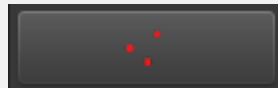
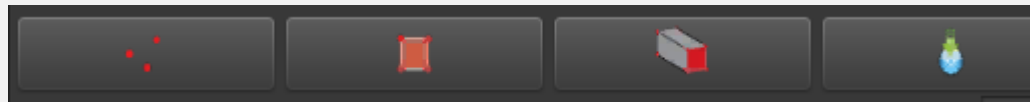
For production work please use the inspector version and not the editor window version, the editor window version is experimental and has been developed upon requests from the community.



Once you select the edit tab you will then be able to modify the current selected mesh in the copy list, it might take some time to build the data if you have a very large mesh but you should be fine if you are using 1500-4000 which is the best when it comes to performance.

Edit Essentials

The following tools are essential when working with the edit mode



Allows you from selecting vertices from the sceneview



Allows you from selecting triangles from the sceneview



Extrudes the selected triangles





Assigns the selected material to the current selected triangles

Multi selection

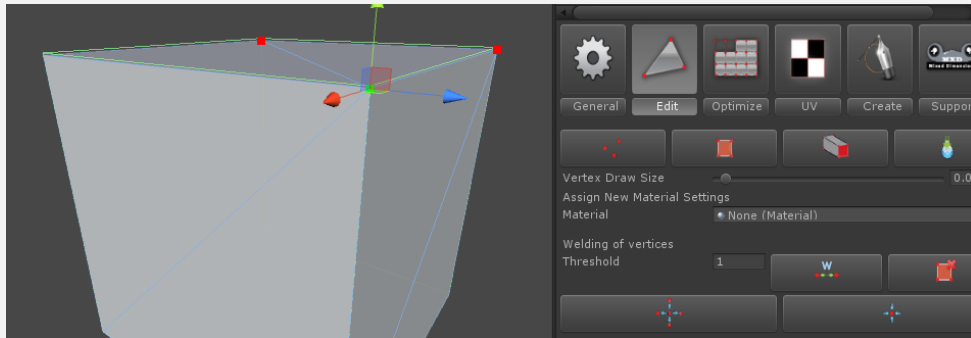
Before we go into vertices & triangles manipulation, it is possible to do multi selection through **SHIFT** button; you can either add\ remove from the selection through clicking on either triangles or vertices or by drawing a selection box with the mouse.

With the **SHIFT** button it is possible to add to selection or remove from the selection this is good either for expanding the selection or inverting the selection on the other hand **CTRL** button can be used to remove from the selection, to add to the selection hold down both **SHIFT +CTRL**.

Editing vertices

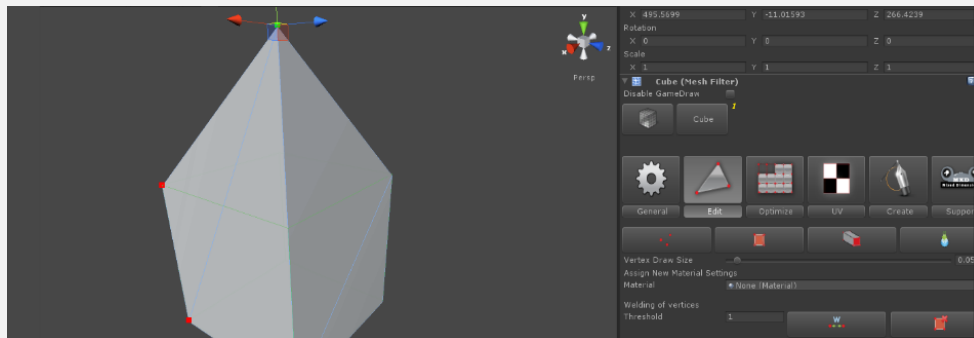
To edit vertices click on the vertices selection button  now you will be able to use the same tools used by Unity , you can select and move vertices through the move button, you can rotate them using the rotate button and you can scale them using the scale button.



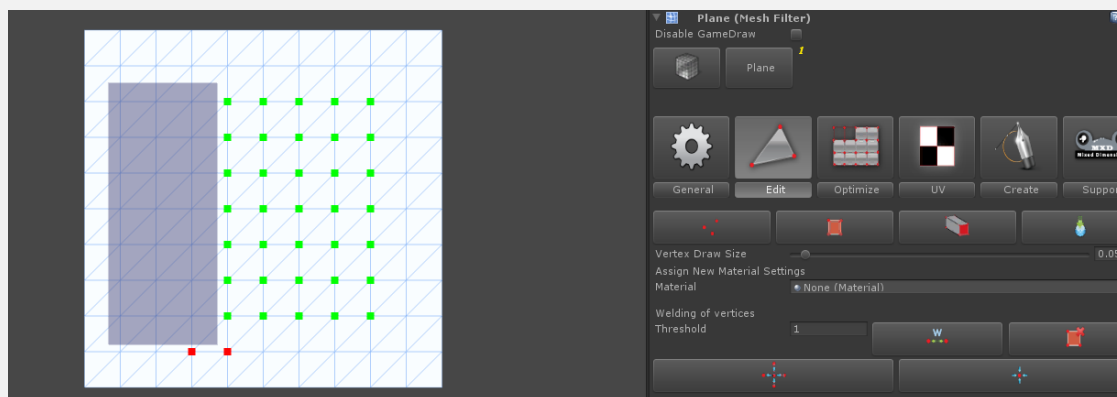


Moving, Rotating and Scaling vertices

Once you hover over a triangle, 3 vertices will be highlighted representing that triangle, select any of them or all of them or use the selection in order to select the vertices you would like to edit once you do that then you can use Unity tools to modify them

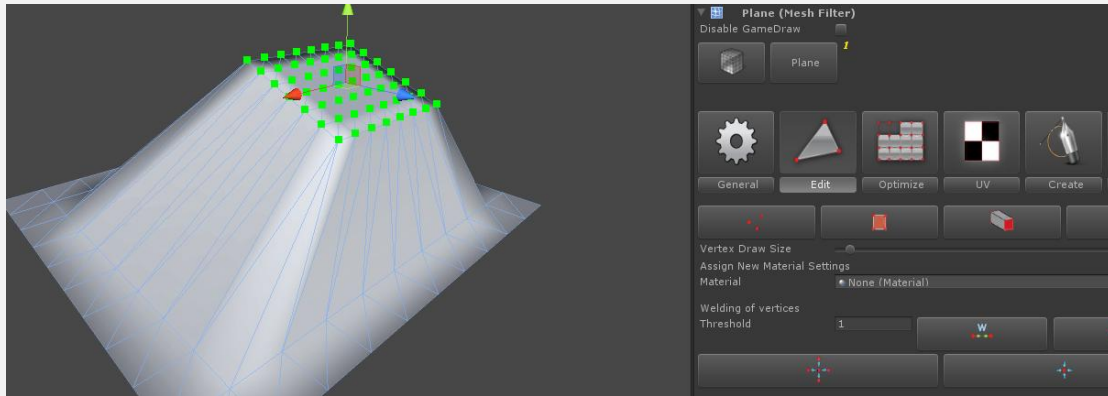


Multi selection of vertices is illustrated in the below picture



After modifying the vertices through translation, rotation and scale.





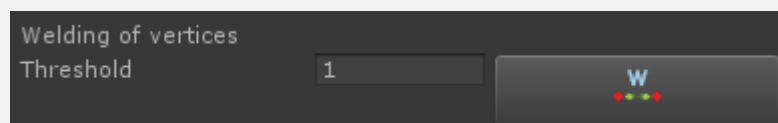
Vertex draw size


Sometimes you might want to control the size of the vertices handles and this can be done the vertex draw size field so you can enlarge or downsize them by changing this value.



Vertex welding

It is possible to weld between multiple selected vertices either by setting a threshold value the represents the maximum distance to be acceptance between two vertices in order to old between them, if the value is zero then all vertices will weld together.



To weld between multiple vertices what you need is to just set the threshold value and then click on the “weld” button .

Deleting vertices

To delete vertices select the vertices you want to delete then click on the delete button



, this will remove the vertices and any associated triangles with them.

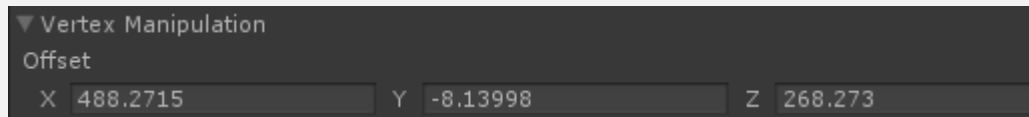
Vertex selection tools

It is possible to modify the selection by either growing the selection or by shrinking the selection, this can be done through the following 2 buttons, the button on the left is the grow selection and the button on the right is the shrink selection.



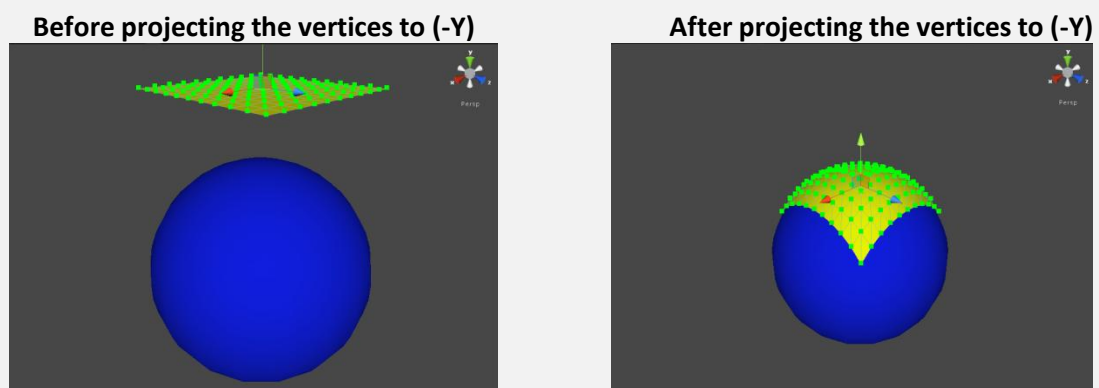
Vertex offset

It is possible to move the vertices through an offset value, this is important especially if you want to move the vertex by a specific amount so you can simply set the X,Y,Z values respectively in the Offset field under vertex manipulation.

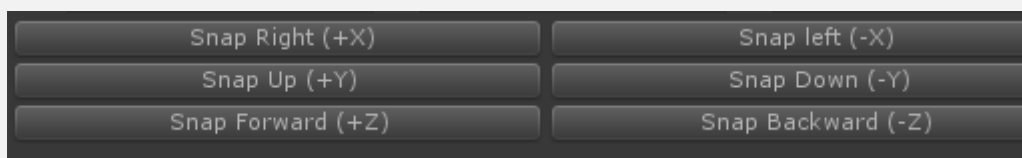


Vertex projection (snapping)



It is possible with GameDraw to project vertices into other colliders in the scene making your scene more realistic and this can be used in a lot of scenarios whether it is a cosmetic thing or to create new meshes, this is totally possible and illustrated in the below images



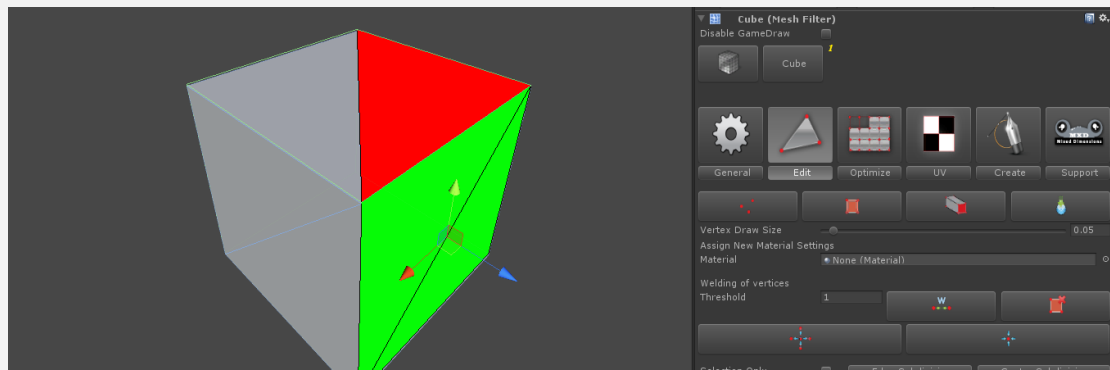
You can project (snap) vertices to all direction using the snapping buttons in the edit tab as in the following, to snap vertices just select the vertices you want to snap and click on one of these options:



Editing triangles

To edit triangles click on the triangles selection button  now you will be able to use the same tools used by Unity , you can select and move triangles through the move button, you can rotate them using the rotate button and you can scale them using the scale button.

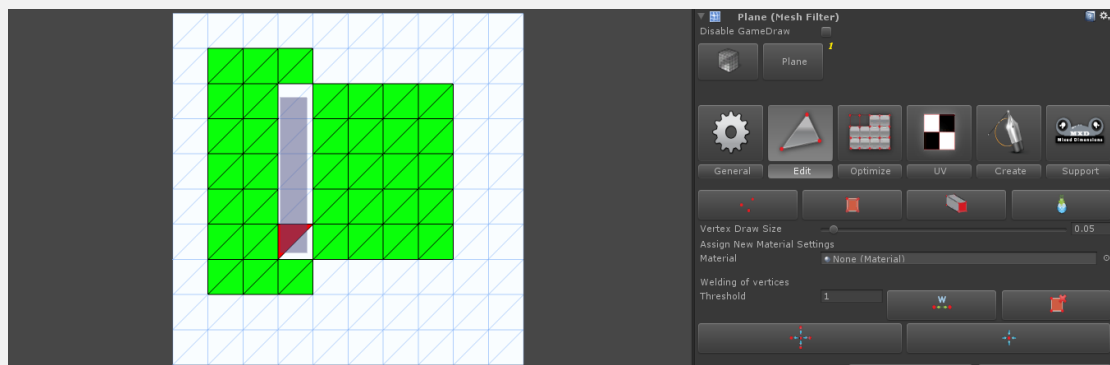




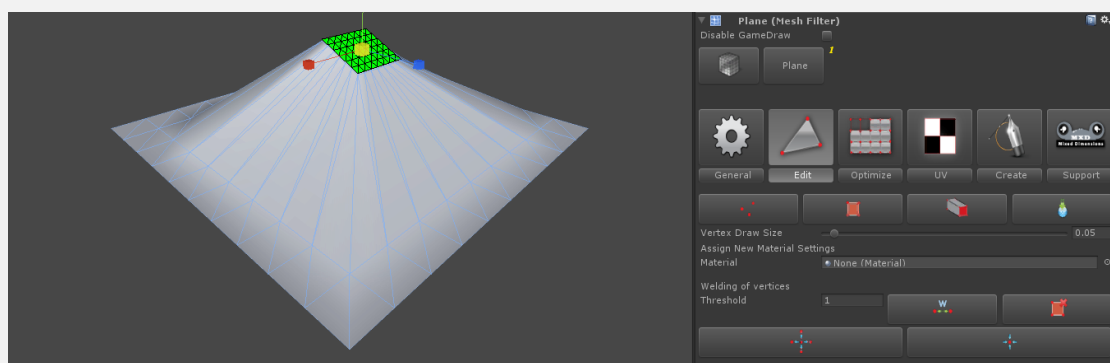
Moving, Rotating and Scaling triangles

Once you hover over a triangle you will get it highlighted, select it by clicking with the mouse, drawing a selection box and ofcourse by using the SHIFT and CTRL as described in multi selection section, once you selected triangles then you will be able to modify them and apply functions such as extrude.

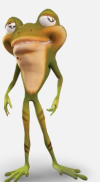
Multi selection of triangles is illustrated in the below picture



After modifying the triangles through translation, rotation and scale.



Functions like extrude, subdivide, clone, detach, assign new material and flip CW/CCW require triangles selection.

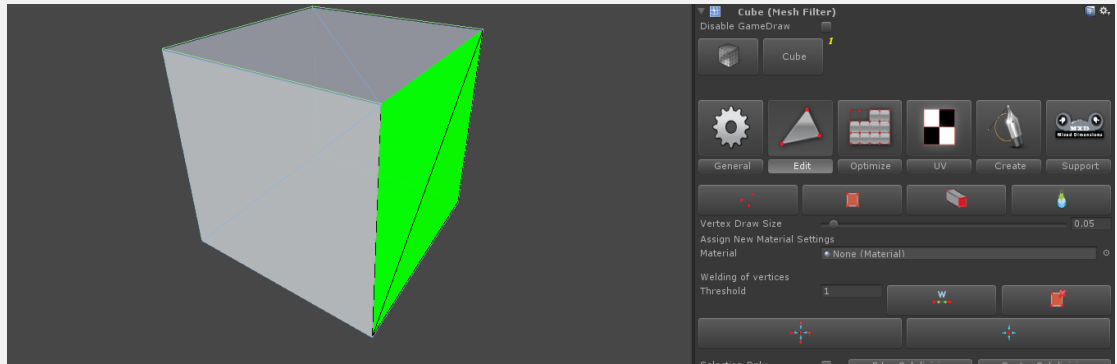


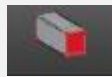
Extrude

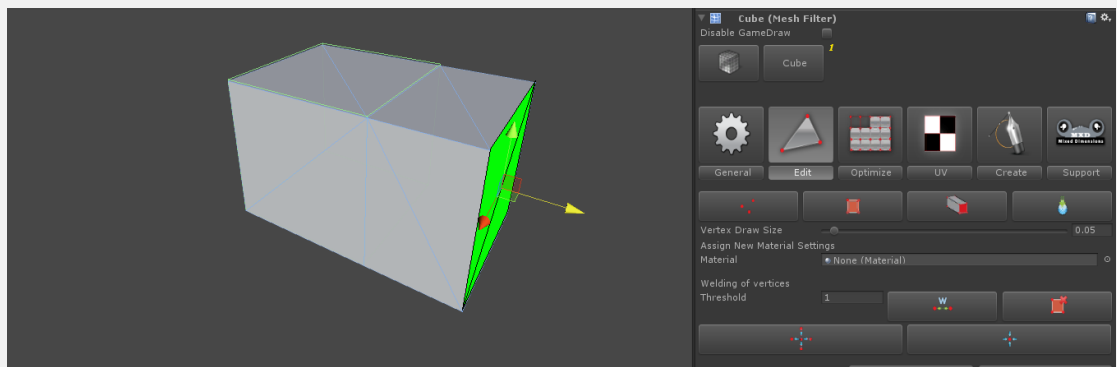
One of the most important functions of GameDraw is the ability to extrude selected faces which allow you from modifying objects and creating new objects from primitives and other objects.

To extrude you need to do the following:

- 1- Select the triangles you want to extrude



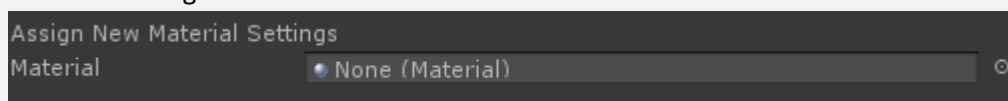
- 2- Once you select the triangles then click on extrude selection button  after clicking the extrude button then the new faces will be created all what you have to do then is to move, rotate or scale them as illustrated below:




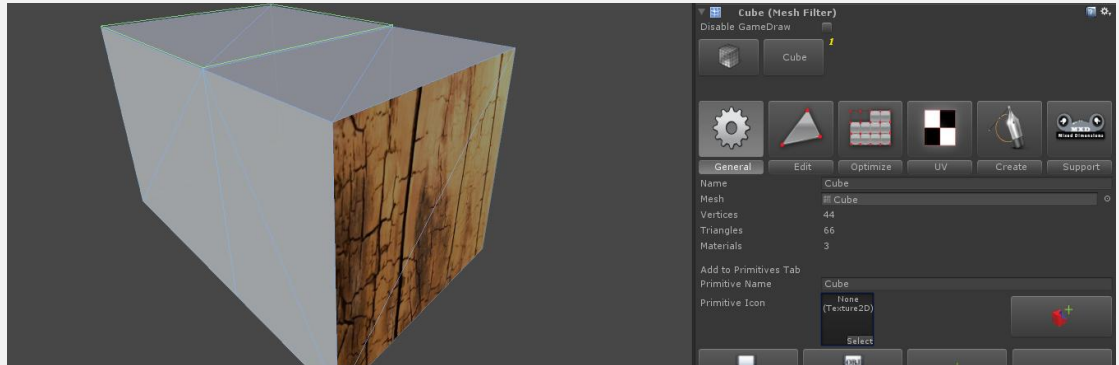
Assign new material

Another important feature of GameDraw is the ability to assign a new material to selected triangles, this can be done through the following:

- 1- Select the triangles you want to assign the material for.
- 2- Select the material you want to use in the “material” field under “ assign new material settings”



- 3- Once the material selected then all what you have to do is to click on the assign new material button  this will modify the mesh to include the sub mesh as well as to add the material to the mesh renderer.



Deleting triangles

To delete triangles select the triangles you want to delete then click on the delete button



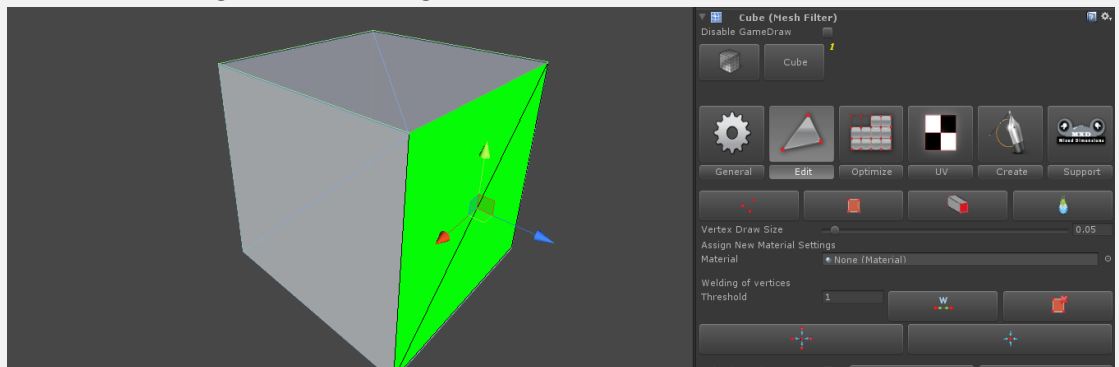
, this will remove the triangles and any associated vertices that does not link to any other triangles.

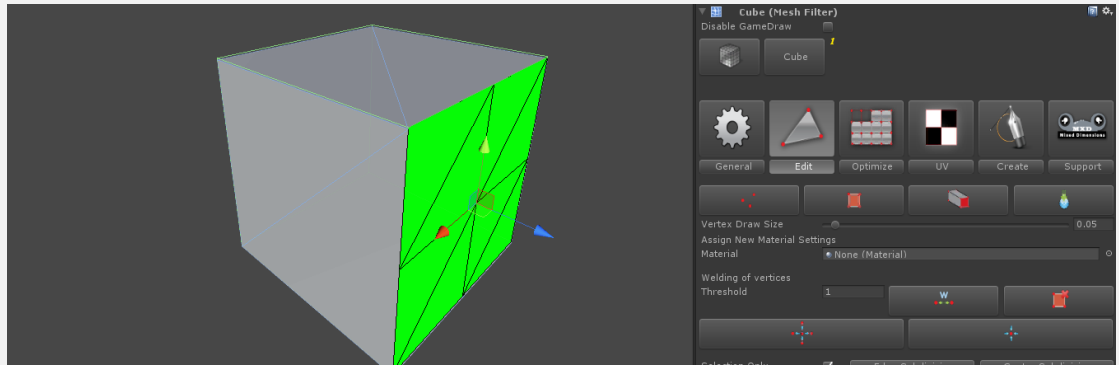
Subdivide

GameDraw allows you from subdividing a whole mesh or parts of it, it offers 2 types of subdivision:

- 1- Edge subdivision:

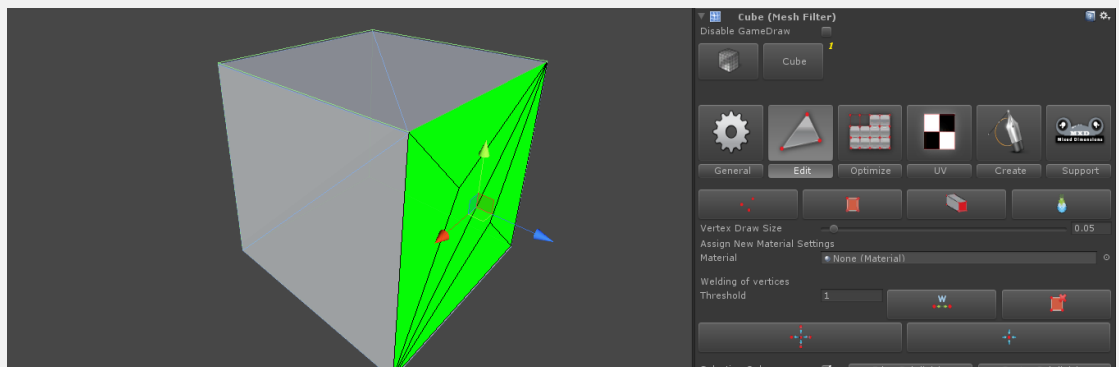
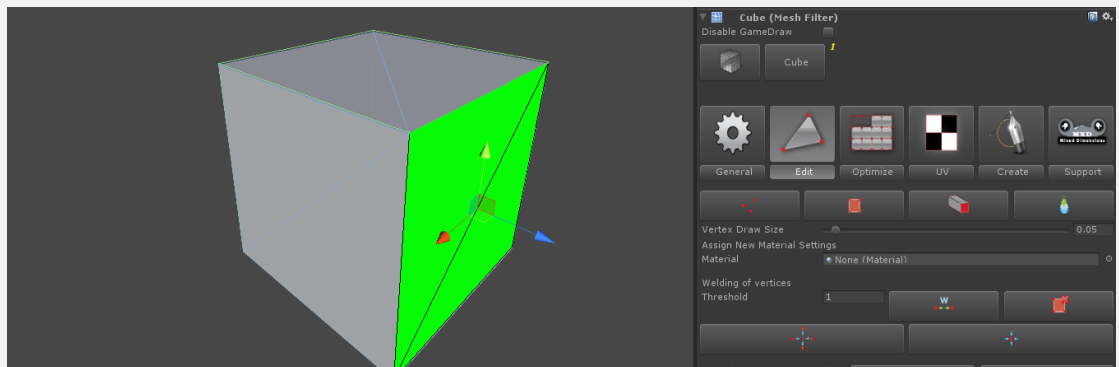
This type of subdivision will turn each triangle into 4 by creating a vertex in the center of each edge and then triangulate these vertices as illustrated below:



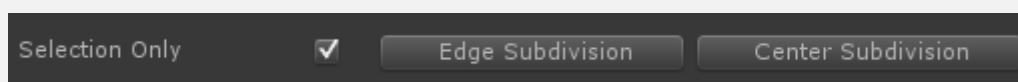


2- Center subdivision:

This type of subdivision creates a vertex in the center of the triangle and then connects all vertices of the triangle with it generating the new triangles as illustrated below:



To subdivide the whole mesh all you have to do is to click on either the “Edge subdivision” button or on the “Center subdivision” button.



To make it only apply on the selection all what you have to do is to toggle on the selection only field before the buttons.



Flip CW\CCW

Sometimes you find that your model has wrong orientation either CW\CCW standing for Clockwise and Counter Clockwise respectively, in order to fix this all what you need to do is to select the triangles with the wrong orientation and click on the flip CW\CCW button under other functions foldout

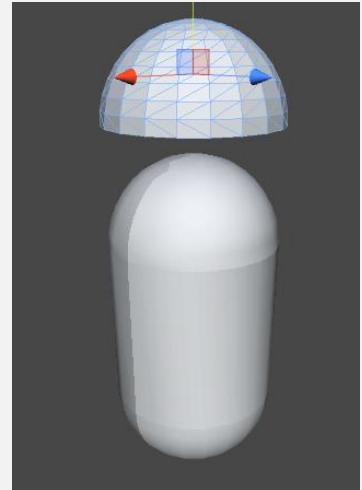


Clone

With GameDraw it is possible to clone parts of your mesh into a separate GameObject which is very useful when you want to use parts of existing models.

To clone part of your mesh you need to do the following:

- 1- Select the triangles of the part of the mesh you want to clone.
- 2- Once selected then all what you have to do is to click on the clone button under the other functions foldout.
- 3- The result is a new GameObject with the cloned part of the mesh.



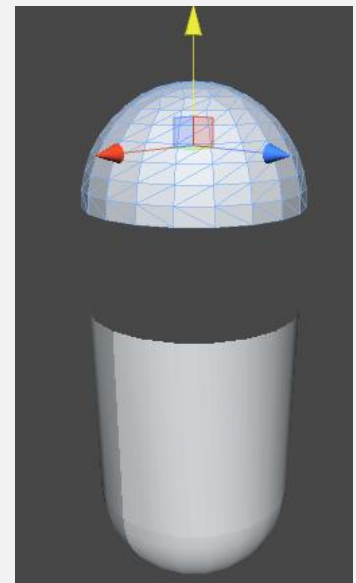
Detach

With GameDraw it is possible to detach parts of your mesh into a separate GameObject which is very useful when you want to separate parts of your mesh.

To detach part of your mesh you need to do the following:

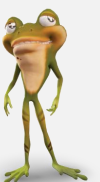
- 1- Select the triangles of the part of the mesh you want to detach.
- 2- Once selected then all what you have to do is to click on the detach button under the other functions foldout.

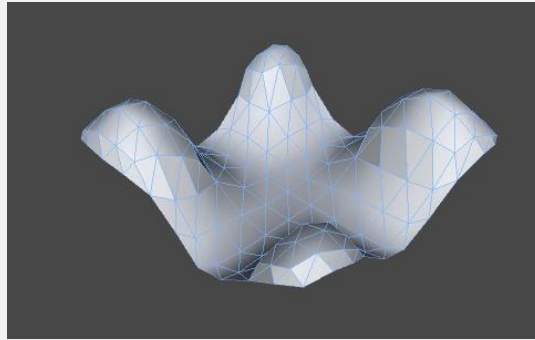
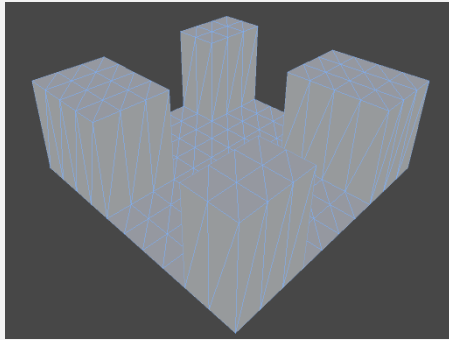
The result is a new GameObject with the cloned part of the mesh



Smooth

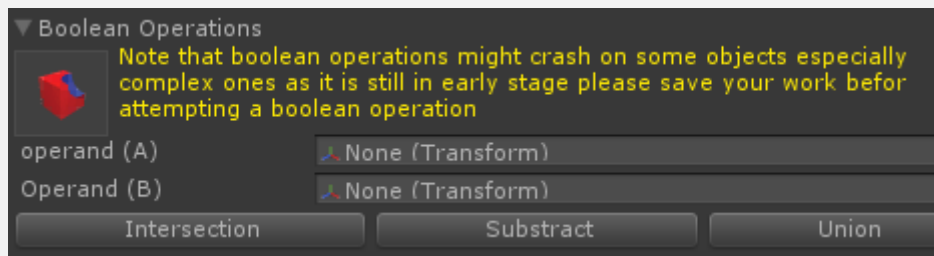
When on the functions that you might need to use is to smooth your mesh to lower the number of hard edges, this can be applied to the mesh through clicking on the smooth button under the other functions foldout.

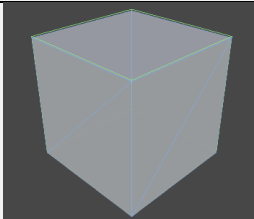
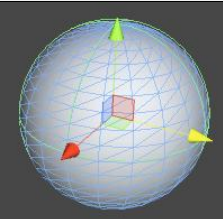
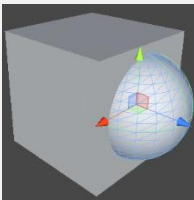
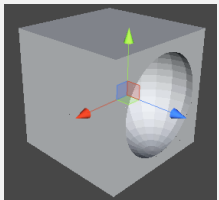
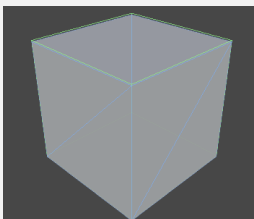
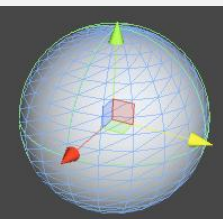
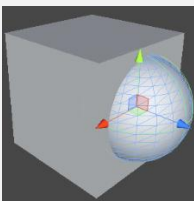
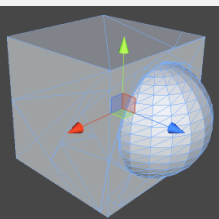
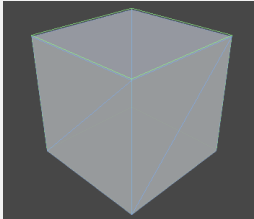
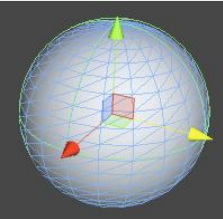
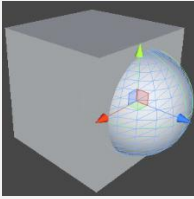
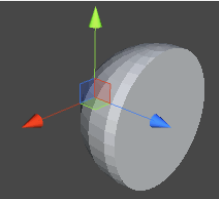


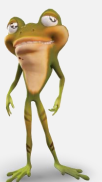


Boolean operations

With GameDraw you can apply boolean operations on different meshes, GameDraw offers union, intersection and subtraction between 2 meshes easily all what you have to do is to select Operand (A) and Operand (B) then click on the operation button you want to execute and once you execute the operation a new gameobject will be created with the result as its mesh.



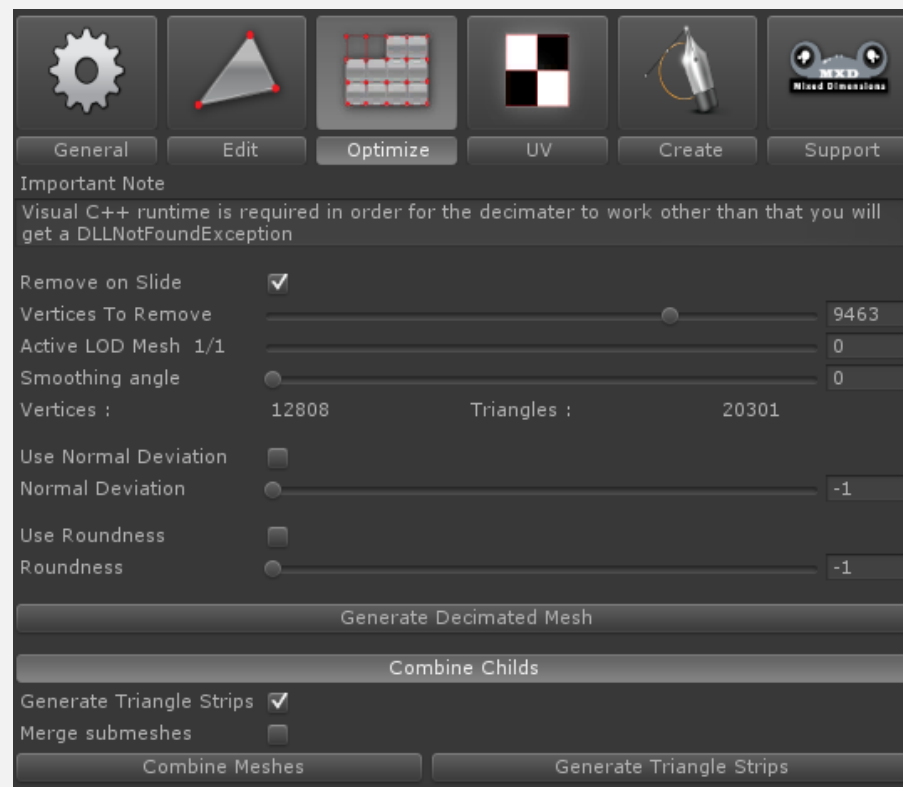
Operand (A)	Operand (B)	Operation	Result
		Subtract 	
		Union 	
		Intersection 	



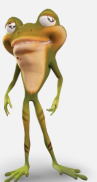
The Optimization Tab

The third tab in GameDraw is the optimization tab in which all functions related to getting your model in its optimal shape for performance goes here, currently this features work in the Windows version of the Unity Editor but we are working on a much enhanced and new one that works on Windows & Mac editors as well as on runtime with your builds.

Optimize Tab

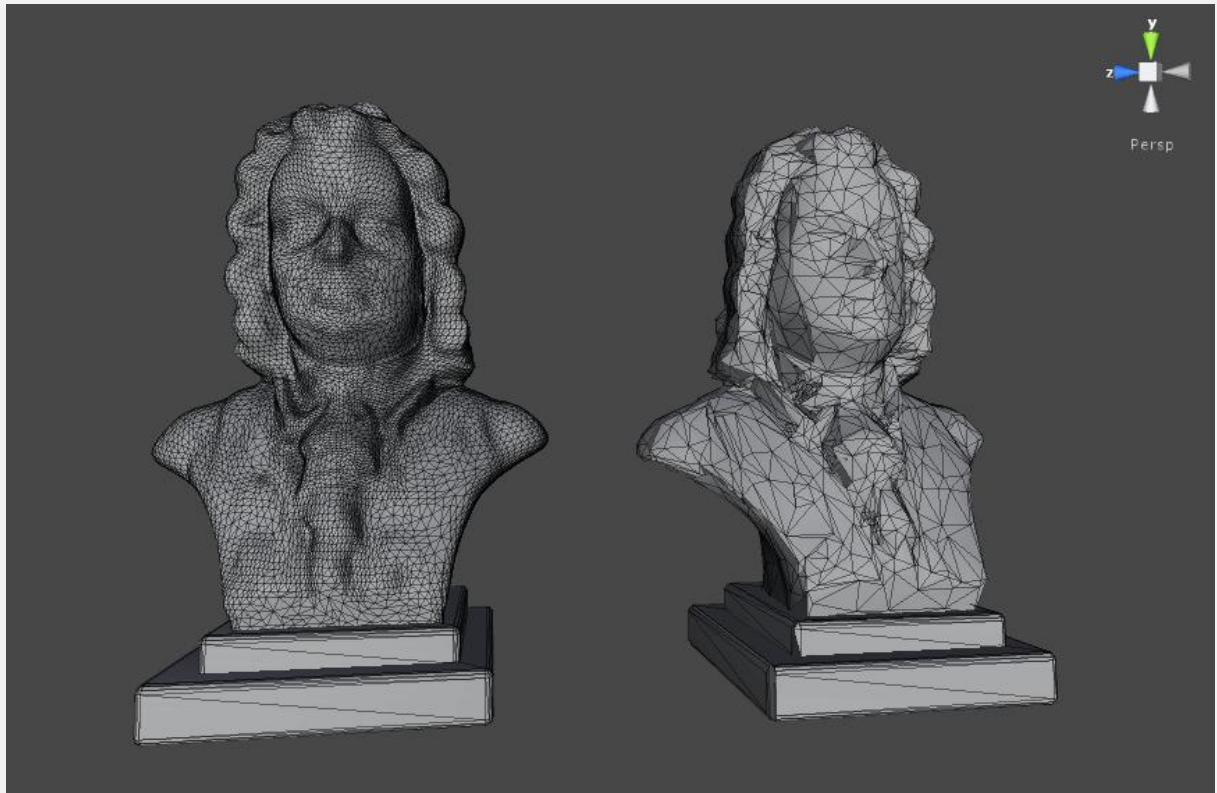


In the optimization tab you will be able to decimate your mesh which will reduce the number of triangles as demonstrated in the above image, decimation has a number of parameters that allows you from controlling how the decimation process is taking place but in general this process is model dependent and you should customize the parameters depending on the model you are working on, the current implementation does not preserve the topology of the mesh but one of a 3 implementations we are working on will preserve it on the other hand you will be able to combine the children of your current GameObject which will also minimize the number of draw calls if they share the same material(s).



Importance of mesh decimation

Lowering the number of triangles of the mesh will result in an increased performance as the overhead of rendering the mesh will go down as the number of triangles goes down, it is important to keep your mesh size within 1000-4000 triangles as this is the best range to work with, even if you go below that the render cost will be almost the same as 1500 on new graphics cards.

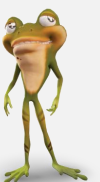


Importance of mesh combine

Mesh combine will reduce the number of draw calls when the combined meshes share the same material(s) which will lead to an increase of performance hence an increase in the number of frames rendered per second (fps).

Mesh combine vs Boolean union

Unlike Boolean union operation which changes the linkage between vertices and hence changes the triangles array the mesh combine will just combine meshes into a single mesh through merging the vertices and triangles lists together and managing submeshes.




Decimating a mesh

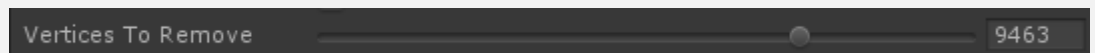
IMPORTANT NOTE

Please note that the current implementation will only work on Unity editors under Windows and will not work on Mac but we are working on a new implementation that supports runtime as well on the other hand the current implementation does not preserve topology which might result in the mesh showing artifacts which can be fixed by editing the mesh.

To decimate a mesh you need to follow the following steps:

Decimating a mesh with realtime preview while sliding

- a. To enable realtime decimation you will need to toggle on the “Remove on Slide” toggle button .
- b. To start decimation all what you have to do is to slide the vertices to remove slider to the right which will result in the mesh getting decimated.

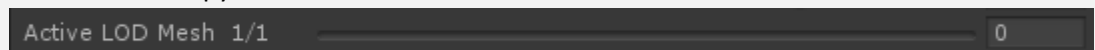


You can optionally set the value on the right which introduced the number of vertices to remove from the mesh.

Decimating a mesh on click

This option allows you from creating multiple copies of the mesh on each decimation process which can be later used for LOD, all what you have to do after following the next steps is to create a new copy and then save it to use it with an LODGroup:

- c. Untoggle the “Remove on slide” toggle button if it is toggled on.
- d. Set the number of vertices you want to remove in the “vertices to remove” slider.
- e. Click on “generate decimated mesh” button which will decimate the mesh and creates a copy that is added to the LOD mesh list.



Navigating through LOD meshes

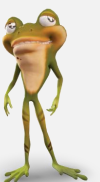
To navigate through LOD meshes all what you have to do is to slide or set the value of the active LOD mesh slider which will result in changing the current meshfilter's mesh into the targeted decimated mesh.

Smoothing Angle

This is the same as the smoothing angle in the importer settings, this causes the importer to apply the specified smoothing angle.

Use Normal deviation

By toggling this, the decimator will track the normals while decimating a normal cone consisting of all normals of the faces collapsed together is computed and if a collapse would



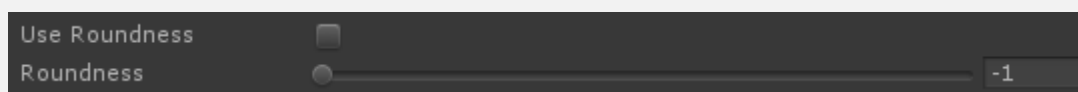
increase the size of the cone to a value greater than the given value the collapse will be illegal.

You can set the normal deviation through controlling the normal deviation value in the normal deviation slider.



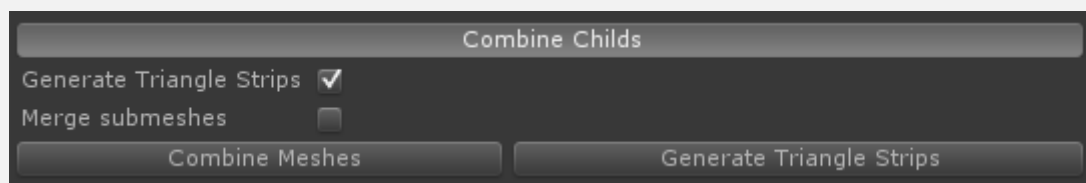
Use roundness

By toggling this, the decimater will use the roundness value of triangles to decimate the mesh, the roundness slider represents the value of the roundness to be used for decimation by the decimater.



Mesh combine

Combines the transform children of the current GameObject in which GameDraw is operating on and combines them into the current mesh, combining meshes is important for performance enhancements but make sure to combine meshes with the same materials or you will not gain any benefits.



Generate triangle strips

Toggle this in order to generate triangle strips which will increase the performance of the generated mesh.

Merge submeshes

It is always recommended to have the least number of sub meshes (materials) for you mesh so if you can combine textures into an atlas and you can use the same shader then it is recommended to use this option to get an increase performance.

Combining meshes

To combine children of the current gameobject click on "Combine Meshes" button and then you will get combined meshes, to combine selection you can use the combine options from the GameDraw menu.

Generate triangle strips

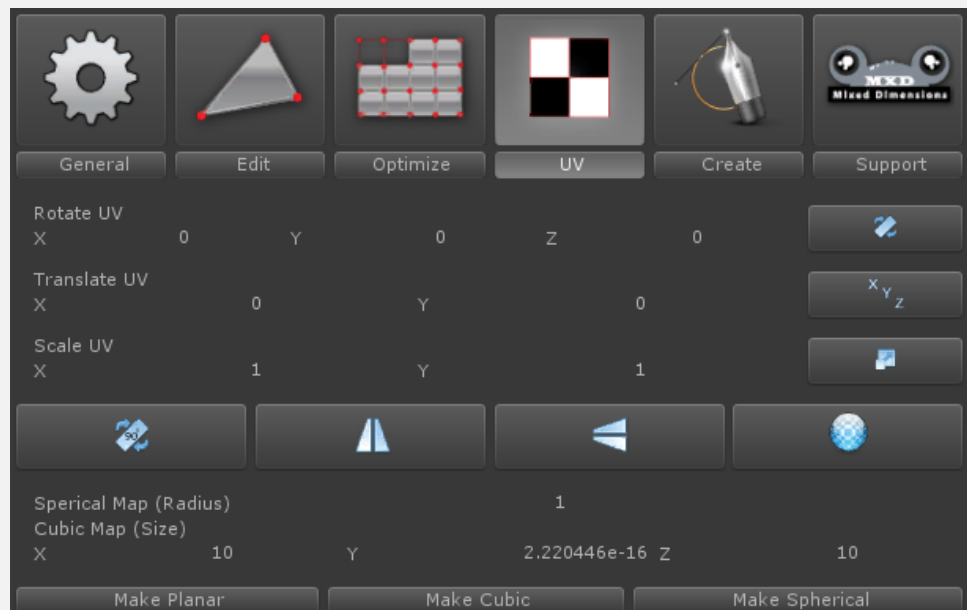
To increase the performance of your mesh during runtime it is recommended to generate triangle strips which will optimize your mesh for rendering, to generate triangle strips click on the "Generate Triangle Strips" button.




The UV tab

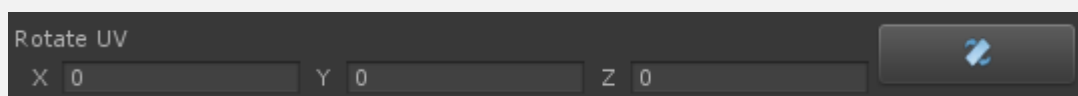
UVs are one of the most important aspects of 3D modeling, having models with correct UVs is important to get a good looking model and to map textures on top of it, the UV tab in GameDraw allows you from rotating, translating and scaling UVs, you can rotate in 90 degrees and you can flip vertical or horizontal as well also there is a UV editor window that allows you from manipulating UV coordinates and it is possible to do UV mapping and unwrapping, you can map to a sphere, a cube or a plane.

UV Editing Tab




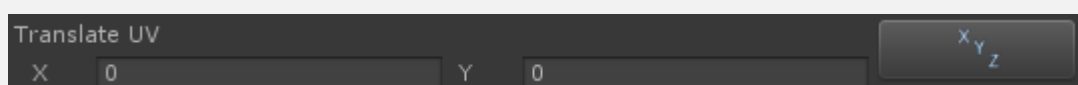
Rotating UVs

To rotate UVs using GameDraw you have to set the X,Y,Z values for the rotation and then click on the rotate button .




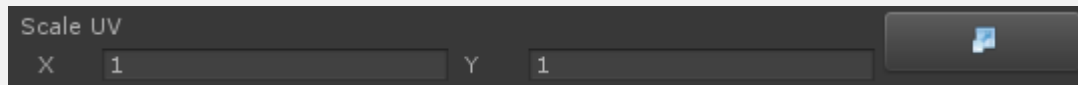
Translating UVs

To translate UVs using GameDraw you have to set the X,Y values for the translation and then click on the translate button . The translation values are between 0 and 1 as the coordinates of the UVs exist in that range.




Scale UVs

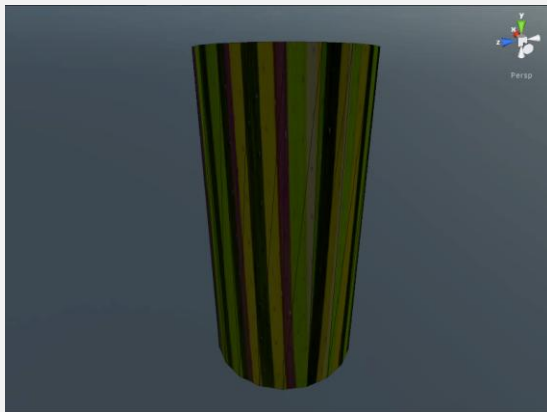
To scale UVs using GameDraw you have to set the X,Y values for the scaling and then click on the scale button .



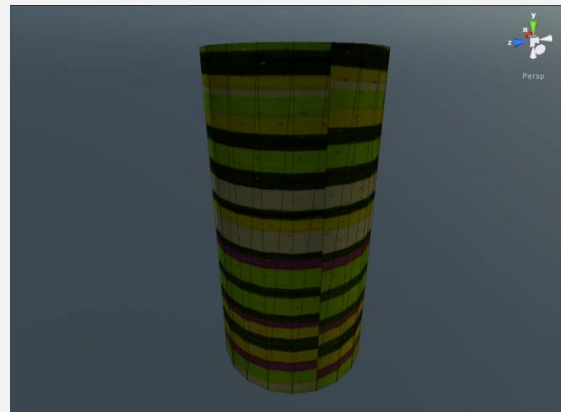
Rotate 90

You can easily rotate your UVs in 90 degrees by clicking on the rotate 90 button .


Before rotate 90



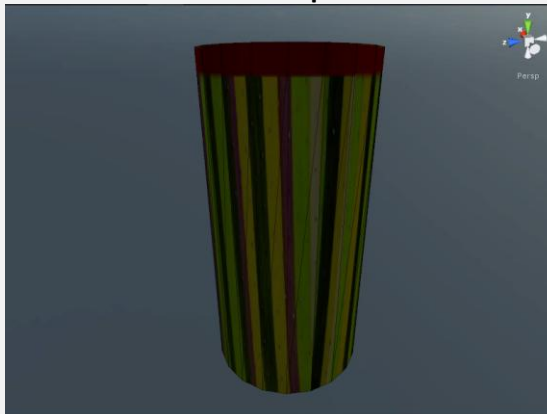
After rotate 90



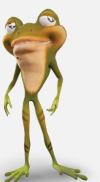
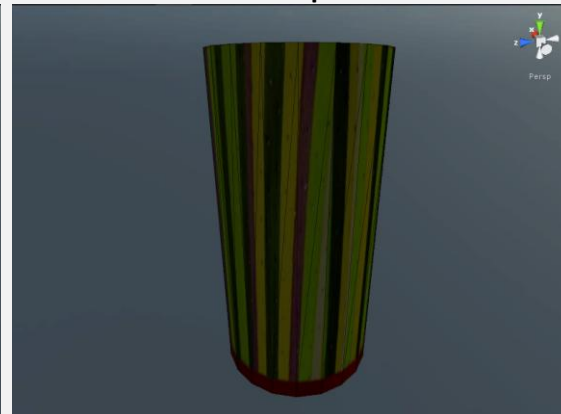
Flip X

You can flip your UVs on the X axis by clicking on the flip X button .

Before flip X



After flip X

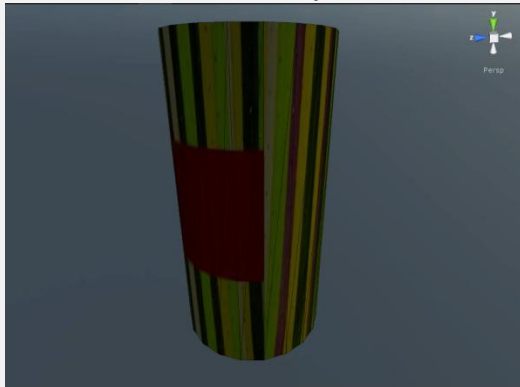


Flip Y

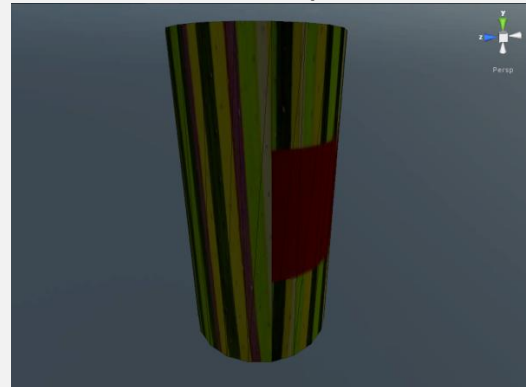
You can flip your UVs on the Y axis by click on the flip Y button



Before flip Y

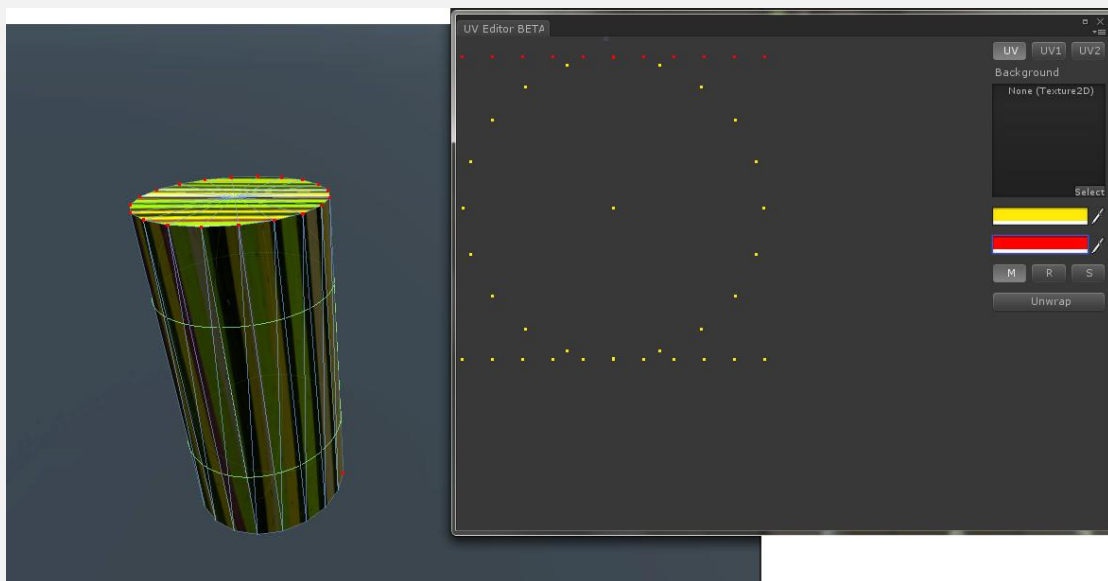


After flip Y



Launching the UV Editor

GameDraw includes a UV editor that allows you from editing your UVs directly through moving the corresponding UV coordinate, unwrapping “flatten” it and almost doing all the operation that you can do with the UV tab, the UV editor is constantly being developed and we always ensure to work on it on every update.

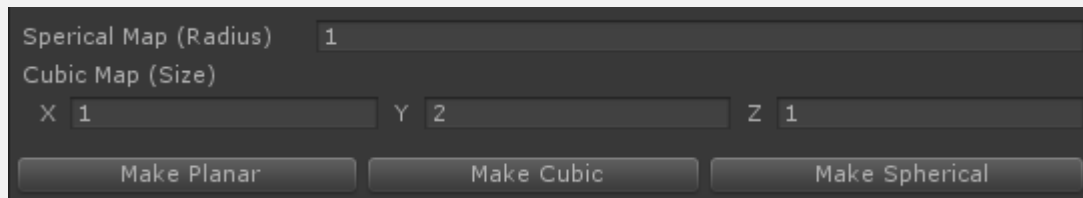


The UV editor is explained in depth in the UV editor section.



UV mapping

GameDraw allows you from mapping your UV coordinates into 3 types of UV maps, spherical, cubic and planar UVs and you can customize both the cubic and the spherical map through customizing their values but we are constantly working on enhancing this part of the UV editor.



Spherical Map (Radius)

This field is used by the “Make Spherical” button in order to generate a spherical map with the given radius.

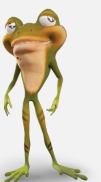
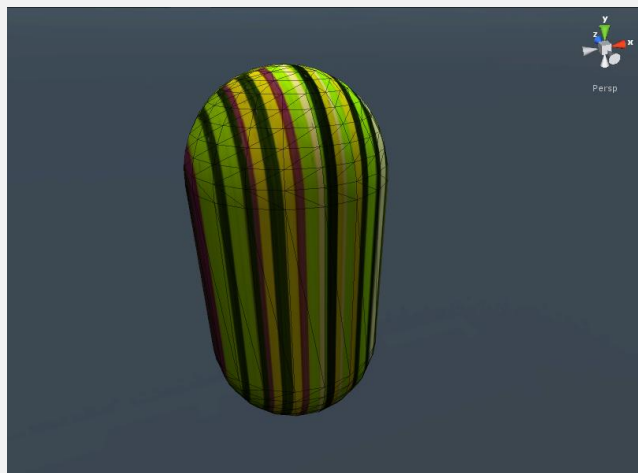
Cubic Map (Size)

This field is used by the “Make Cubic” button in order to generate a cubic map with the given cube size.

Original UVs



Make Planar result



Make Cubic result



**Make Spherical result
(Radius = 1)**



From the image above you can see the results of the UV mapping for the different UV mapping options in GameDraw, we are working on adding more UV mapping options to GameDraw on a constant basis and we would love to hear from you on what you need.

UV mapping on selection will be added in a future update.

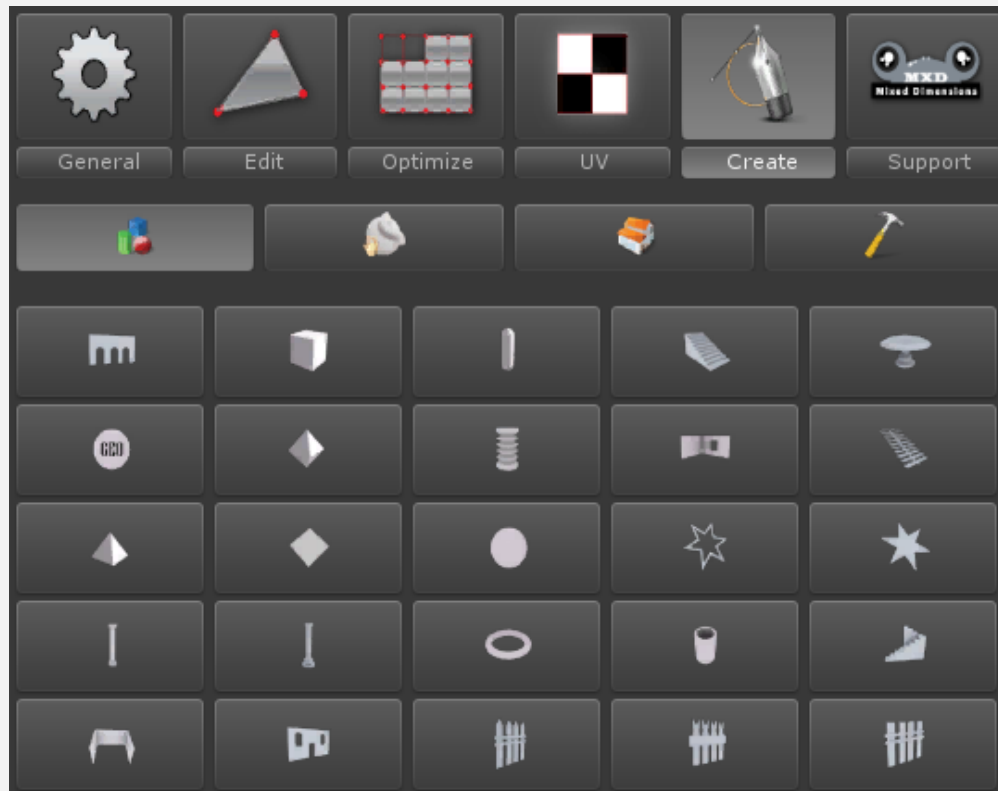


The Create Tab

With the create tab in GameDraw you can create primitives, sculpt meshes, build procedural building and cities (coming soon) and benefit from other Utilities like a node based editor and a 2D to 3D converter.



Create Tab



The create tab includes 4 tabs and each tab of these tabs gives you tools to help you create meshes:

The primitives tab

With the primitives tab you will be able to create objects from a collection of 25 shapes, these shapes can be used to build levels and we are constantly adding new shapes to it.

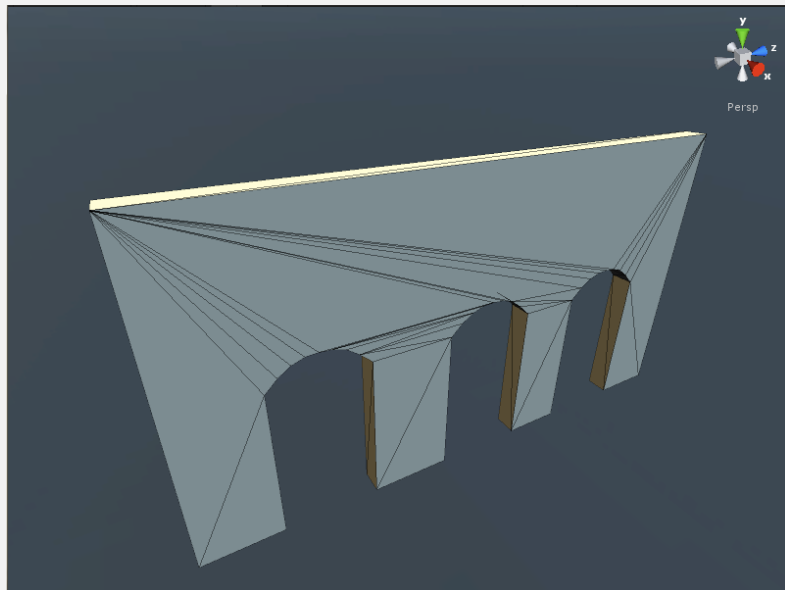


Primitives Tab

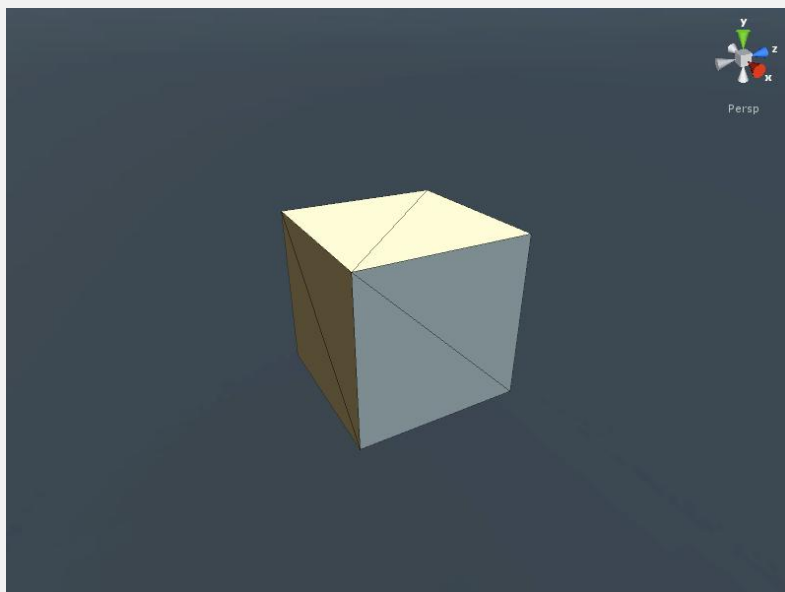


The current available shapes are listed below:

Arc doors



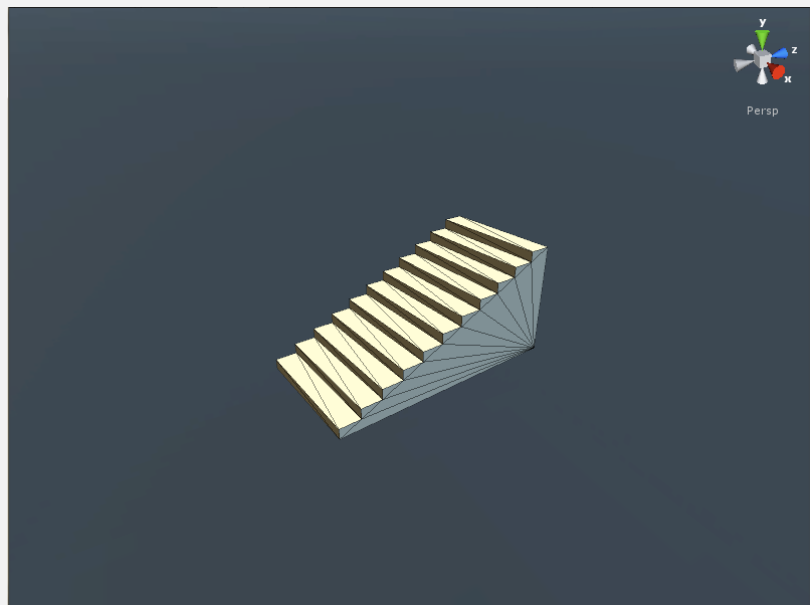
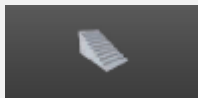
Box



Capsule



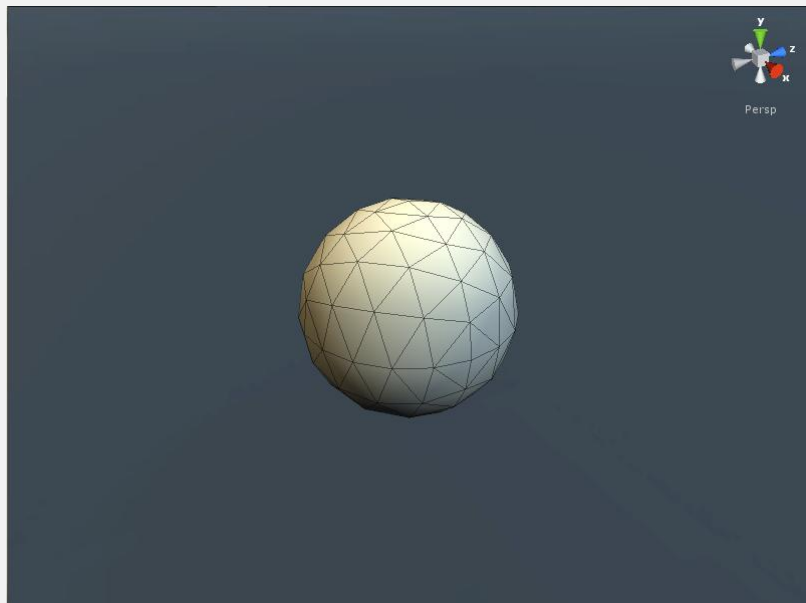
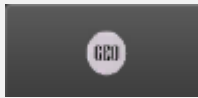
Closed Stairs



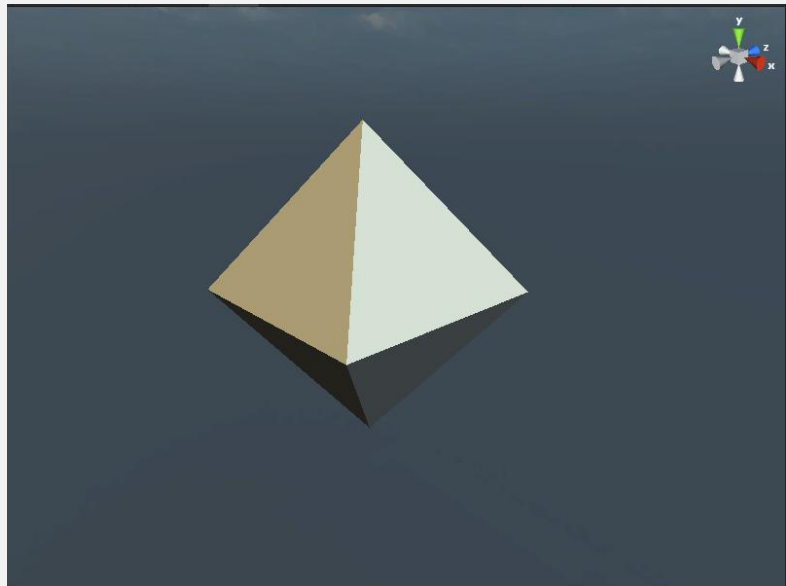
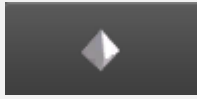
Fountain



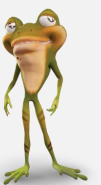
Geosphere



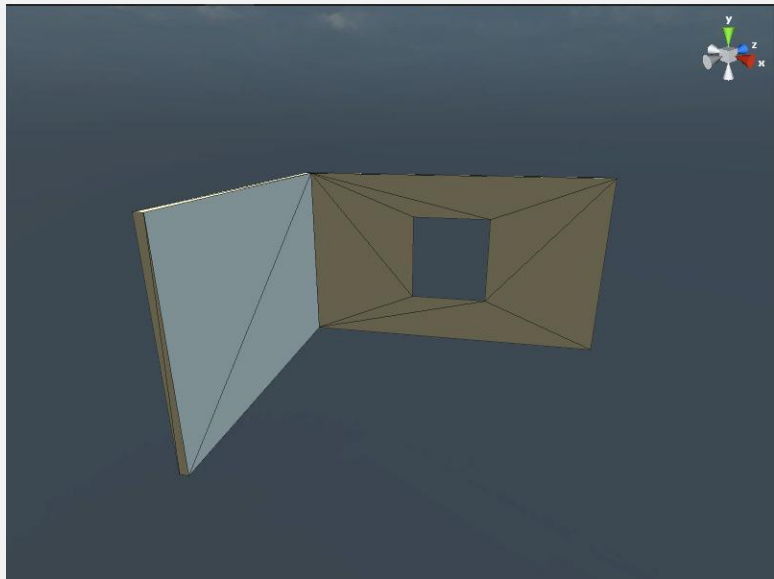
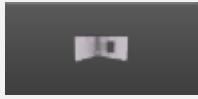
Hedra



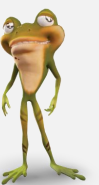
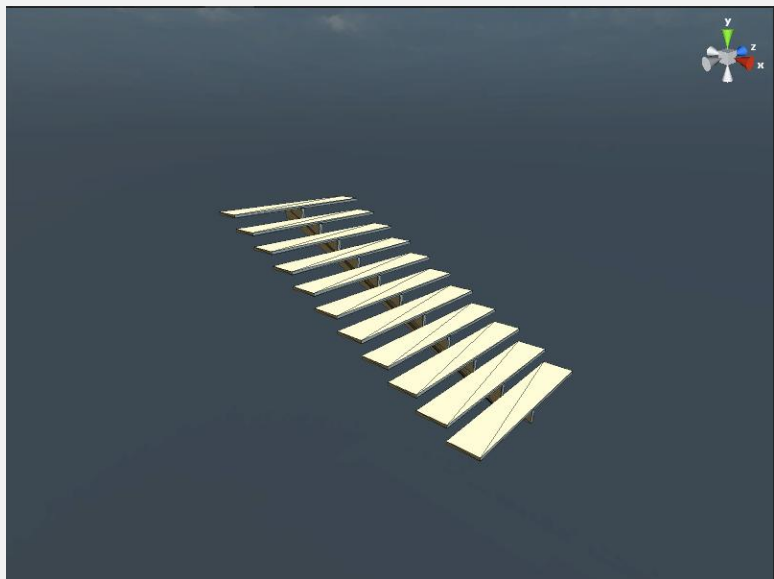
Hose



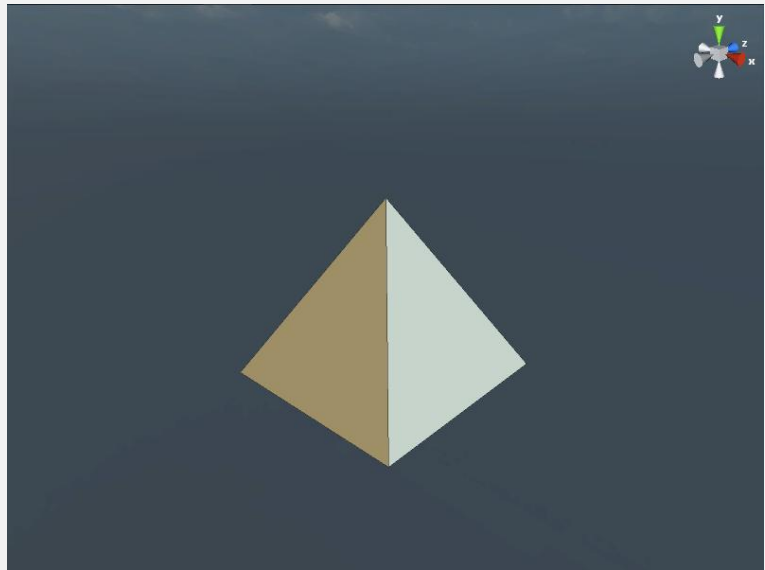
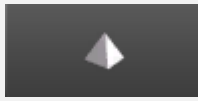
L-wall with window



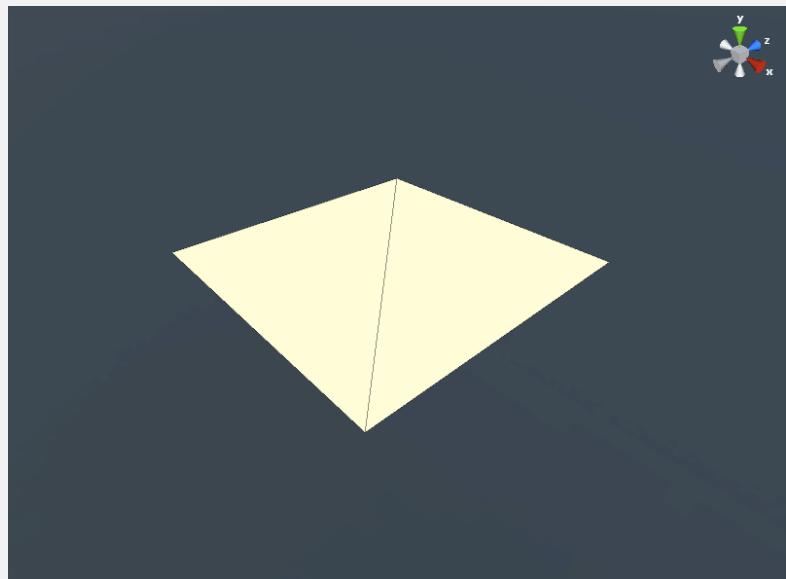
Open stairs



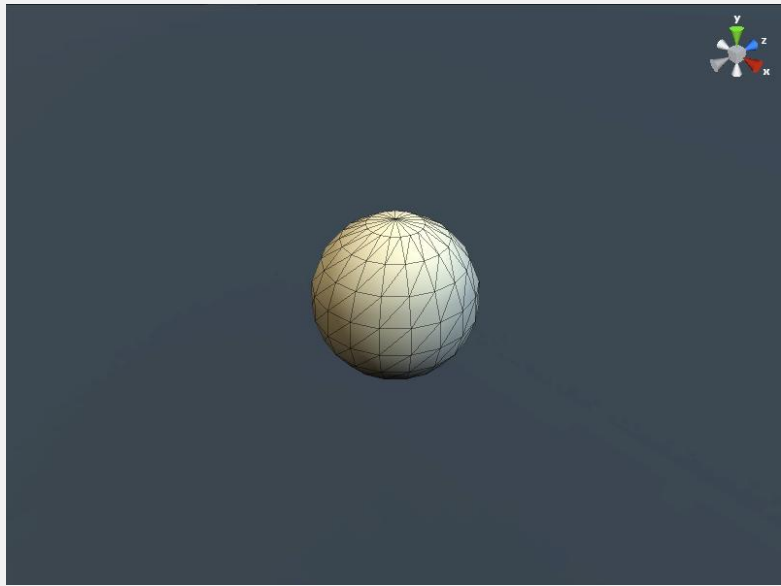
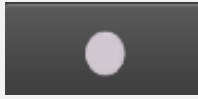
Pyramid



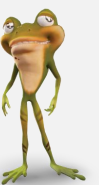
Quad (Plane)



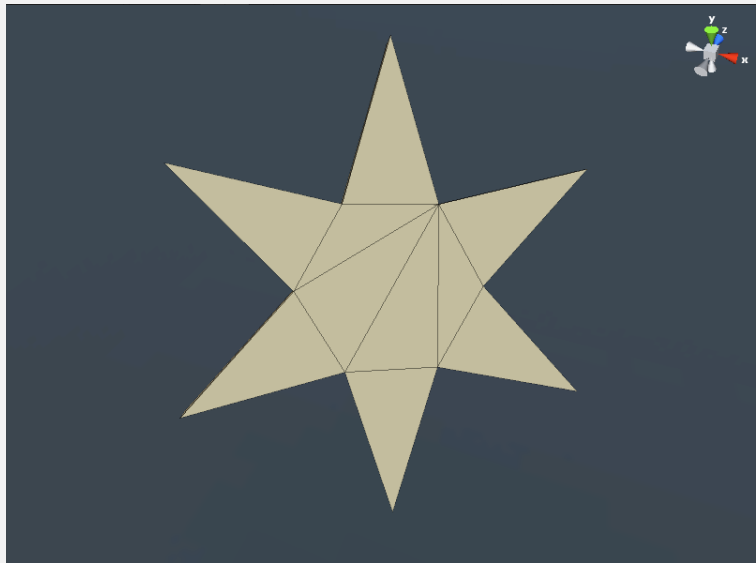
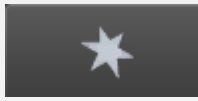
Sphere



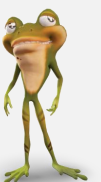
Hollow Star



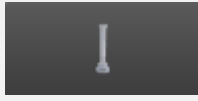
Star



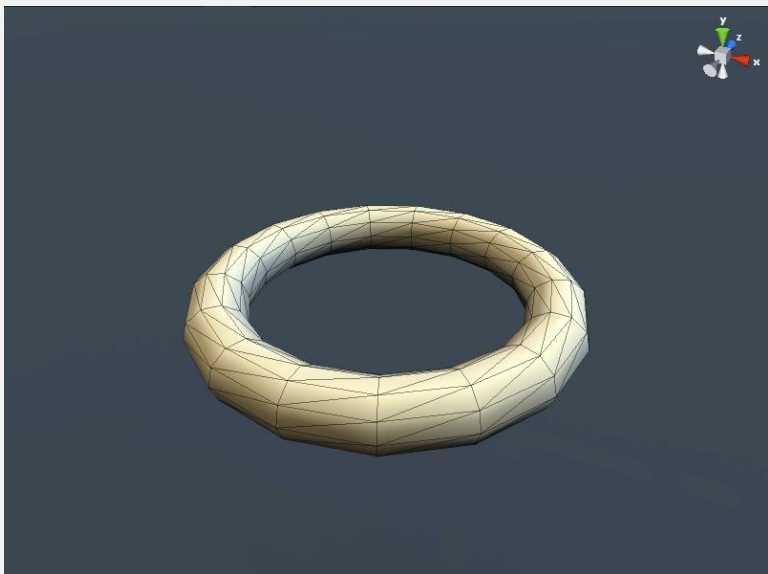
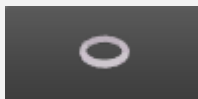
Temple column (Square)



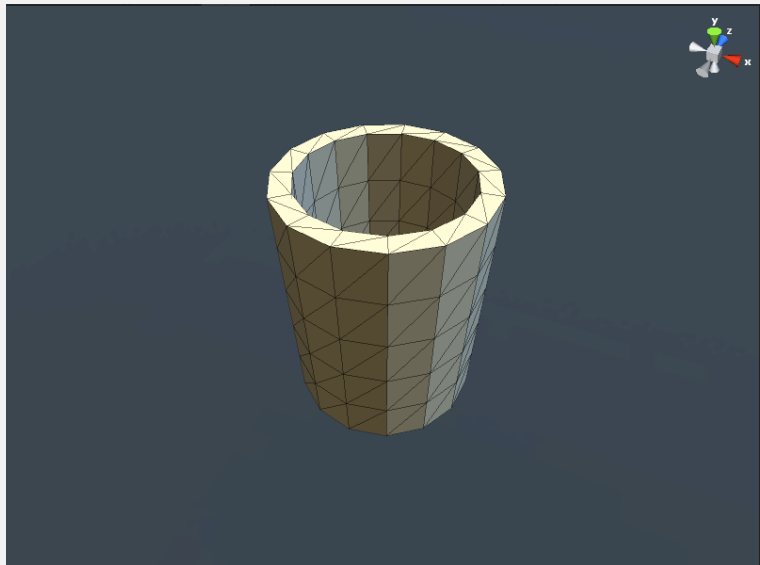
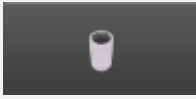
Temple column (Round)



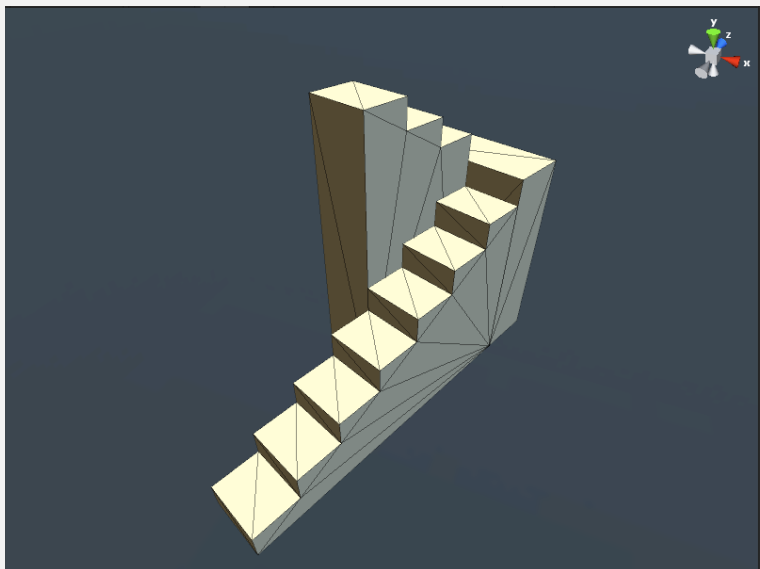
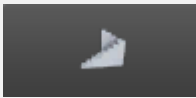
Torus



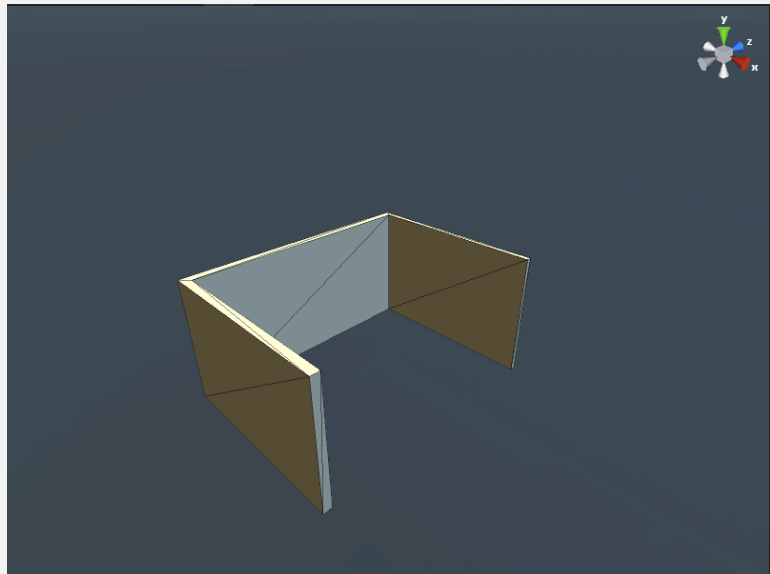
Tube



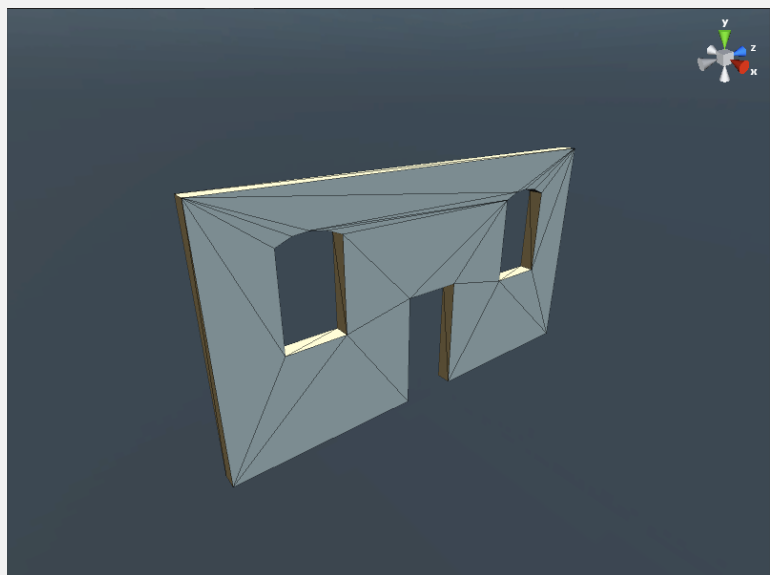
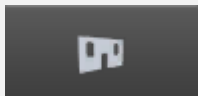
U-Stairs



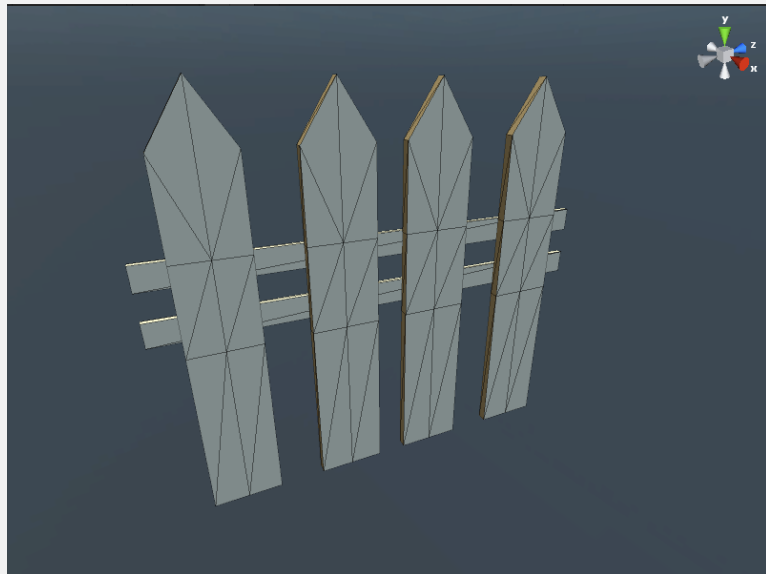
U-Wall



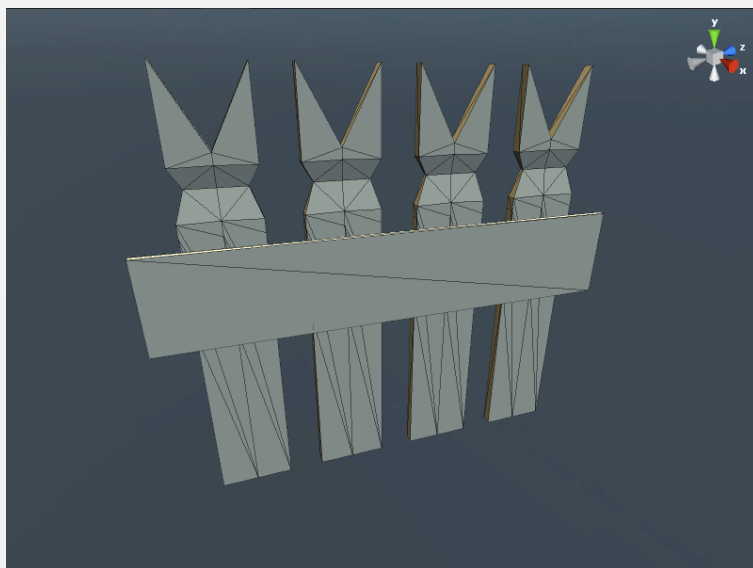
Wall with door and windows



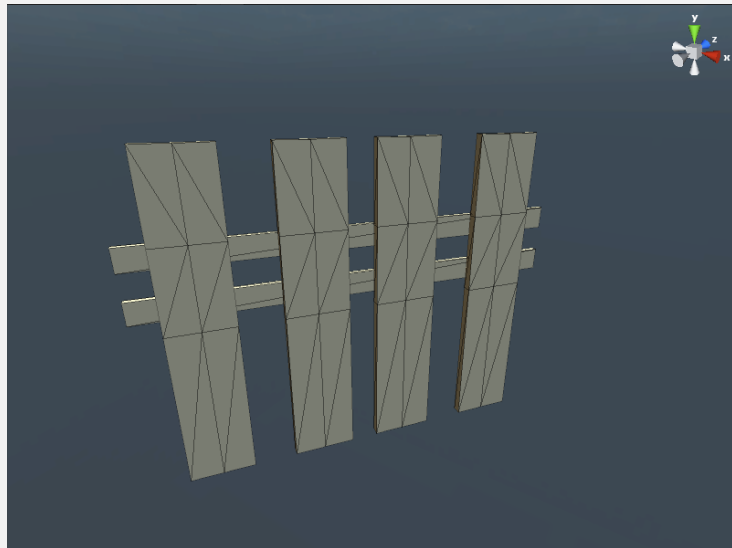
Wooden fence – Style 1



Wooden fence – Style 2

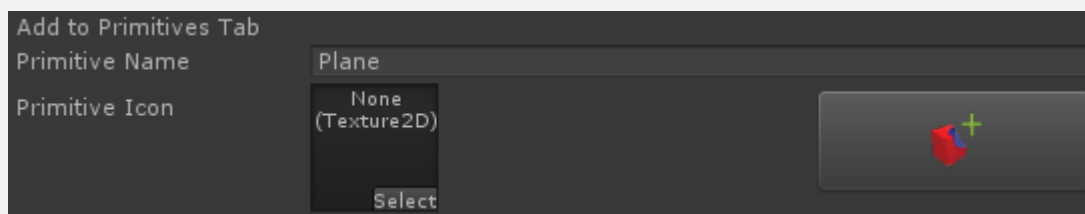


Wooden fence – Style 3



Extending the primitives

You can easily extend the primitives by simply selecting the GameObject you want to add as a primitive and then from the general tab set it a name, an icon and click on the add primitives button as described in the general tab section.



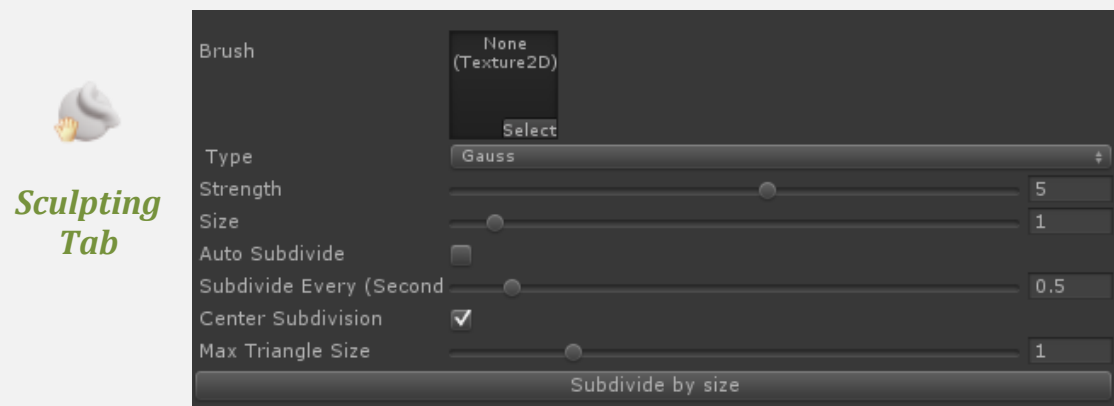
Once you add the model to your primitives then it will appear under the primitives list to the icon and name you have given it.



The Sculpting Tab

With GameDraw you can sculpt shapes using the sculpting tab; it is possible to modify existing meshes and to generate smooth shapes, once you enter to the sculpting tab you will be able to sculpt your mesh right away, with the sculpting tab you can control the way sculpting is happening.

Note that sculpting is still in early stages and we will update this feature with more tools on the near future.

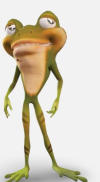
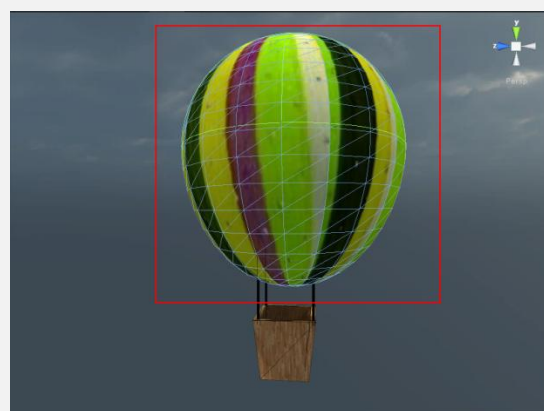
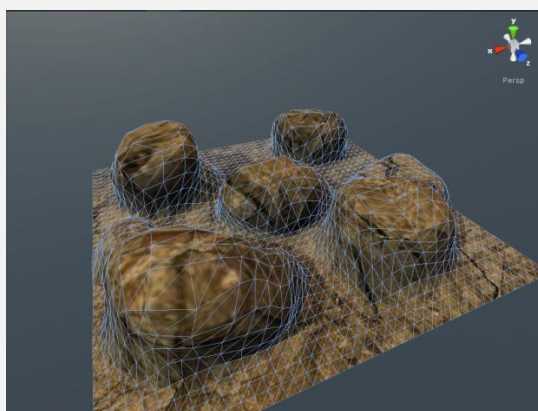


Types of sculpt brushes

There are four types of sculpt brushes that you can use to sculpt your mesh, the type of the brush can be selected from the “type” field dropdown list, these types are:

- 1- Gauss
- 2- Linear
- 3- Needle
- 4- Custom brush

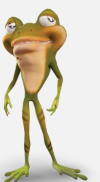
You can use any of them depending on your needs, the custom brush allows you from using a texture in the brush texture field and this will be the texture used as a brush, the following is an example for sculpting:



Sculpt options

There are a number of options you can use with sculpting as described below:

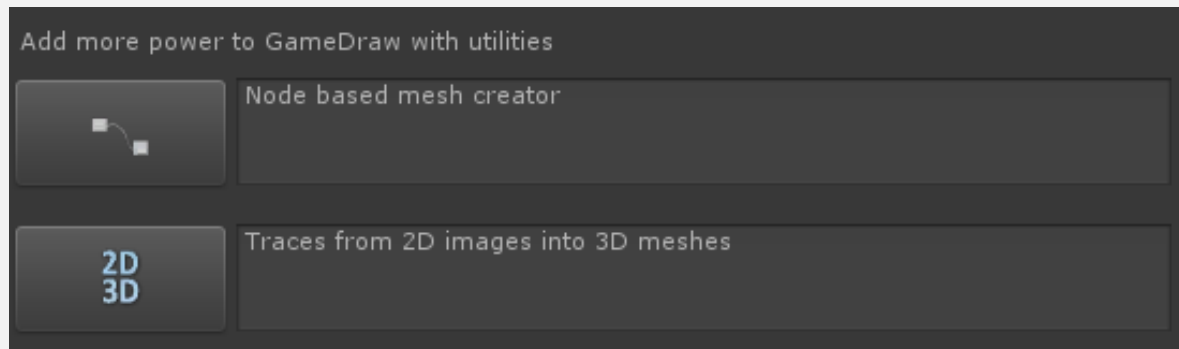
Brush	This is a texture slot that can be used for the custom brush option
Type	The type of brush to be used when sculpting, this can be one of the options listed previously.
Strength	<p>The strength of the brush, this can be a positive or a negative value.</p> <p>When positive the brush will elevate the mesh in respect to the normal direction, in most cases toward you.</p> <p>When negative the brush will push back the mesh in the opposite direction of the normal, in most cases away from you, this is a good option when creating caves, seas, holes, etc.</p>
Size	Represents the size of the brush
Auto subdivide	When toggled on, automatic subdivision will take place according to the following fields.
Subdivide every (seconds)	This slider allows you from setting a timestamp in which the subdivide option will execute if enabled.
Center subdivision	When toggled on any automatic subdivision that will happen will be based on the center subdivision other than that it will be based on edge subdivision.
Max triangle size	This amount represents the size of the triangle on which if the triangle is bigger it should be subdivided
Subdivide by size	Click on this button to force a subdivision operation that depends on the size of the triangle, this is good when you want to subdivide your mesh but without toggling the automatic subdivision on.



The Utilities tab

Utilities are extensions for GameDraw that is delivered by Mixed Dimensions or developed by anyone, utilities are designed to be extendable so you can add your own utilities, we will provide a complete guide with examples in the future on how to create utilities.

GameDraw comes with 2 utilities and we will add more in the future:



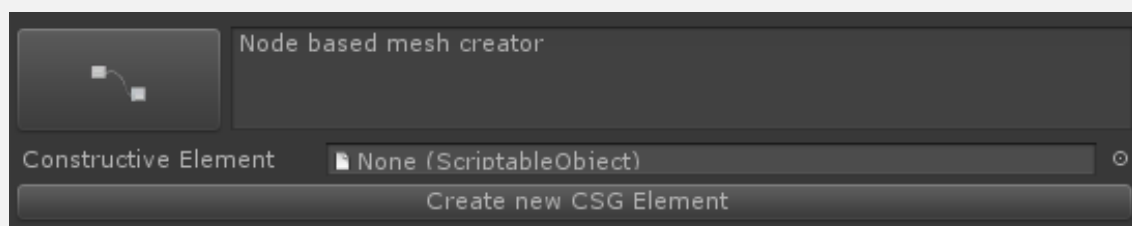
Node based mesh creator

The node based mesh creator is a great way to define your procedural mesh creation routines, it is still in the experimental phase but it will allow you from creating very complex meshes from nodes once completed currently it allows you from doing some Boolean operations so you can nest Boolean operations according to a graph.

On the other hand adding more nodes to it is very easy and can be done through defining a small class but we will provide this information on a later stage.

Creating a constructive element

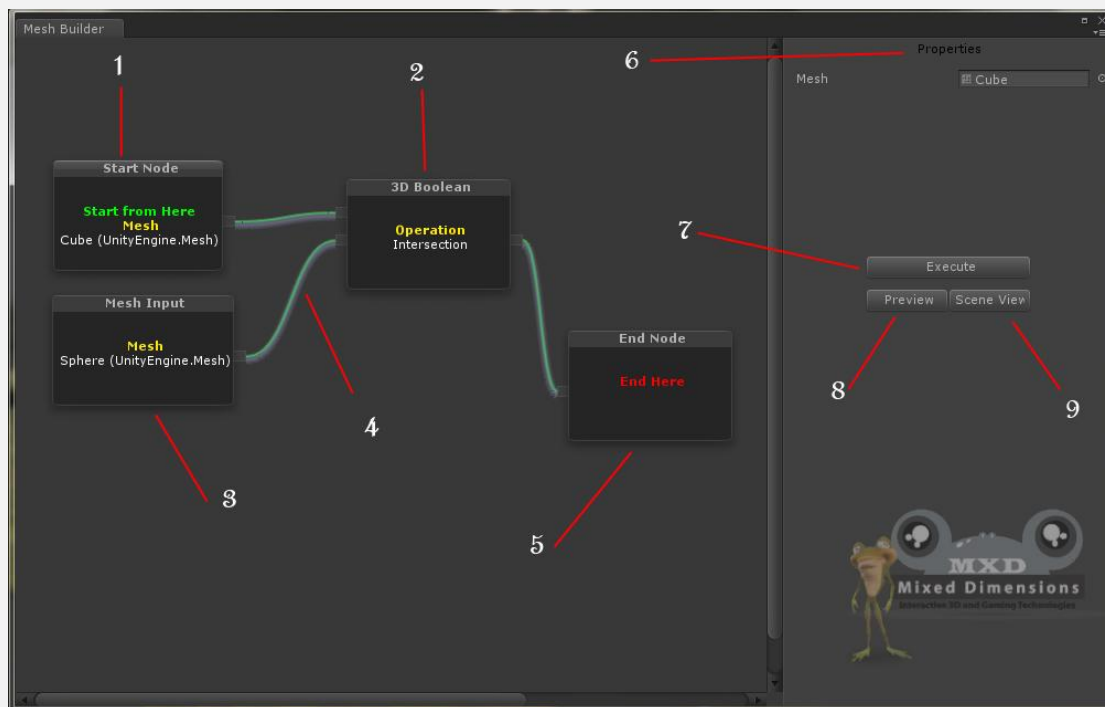
Constructive elements are the elements how hold data of the nodes, creating a constructive element is simple, just click on the node based mesh creator icon to show its list then click on the "Create CSG element" button



Once you click the button a save file dialog will appear, save your element in the desired location with the desired name then you will get the node based editor to show up.



The following figure shows the node based editor window.



The following table describes the elements in the node based editor as numbered in the image.

Number	Type	Description
1	Start node	This is essential, the start node is the starting location for the execution of the graph, all node graphs should have a start node, this holds the initial mesh.
2	Operation node	The operation node is a node type that executes a function by taking a number of inputs and producing an output, in the above image it is a Boolean operation.
3	Input node	The input node is a way of loading assets into the graph for processing.
4	Links	Links are essential to connect between the nodes.
5	End node	An end node is as essential as the start node because it indicates the end of the graph.
6	Properties	The properties show all the fields associated with a node, once you click on a node you will see the properties in the properties list and you will be able to edit them, the node itself will show you the values of its properties inside of its body.
7	Execute	Once clicked, this button will execute the graph and it will generate the result depending on the nodes, in our case this will create a new GameObject with the resulted Boolean.
8	Preview	This will preview the node if it has a preview (not ready)
9	Sceneview	This will show you a preview of the operation in the sceneview (not implemented yet)



Adding a node

To add nodes to the graph you simply need to right click the mouse and you will get a list of available nodes.

With these nodes you should be able to execute Boolean operations between meshes and creating complex Boolean graphs, We will add more nodes in a nearby update.

Removing a node

To remove node simply click on that node and then press the **DELETE** button.

Drawing a link between 2 nodes

To draw a link simple click on an output node and hold down the mouse then move toward the destination node and when over an input slot release the mouse button.

Removing a link

To remove link simply click on that link and then press the **DELETE** button.

Moving a node

To move a node simply click on it and drag it.

Executing the graph

To execute the graph click on the execute button.

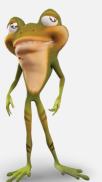
Editing nodes

To edit a node click on it then go the properties list and set the values for the node fields.

Current available nodes

current available nodes are for experimentation and they are:

Start Node Start from Here Mesh Cube (UnityEngine.Mesh)	The start node of the graph, you can give it a mesh or it will create an empty mesh if no reference is assigned. Input: NONE Output: Mesh
End Node End Here	The end node for the graph. Input: Mesh Output: NONE
Mesh Input Mesh Sphere (UnityEngine.Mesh)	This node allows you from loading a mesh into the graph Input: NONE Output: Mesh
Transform Position (0.0, 0.0, 0.0) Rotation (0.0, 0.0, 0.0) Scale (0.0, 0.0, 0.0)	Let you transform the input mesh according to the given values Input: Mesh Output: Mesh
3D Boolean Operation Intersection	Applies a Boolean operation between two input meshes and outputs the result. Input: Mesh (Operand A), Mesh (Operand B) Output: Mesh

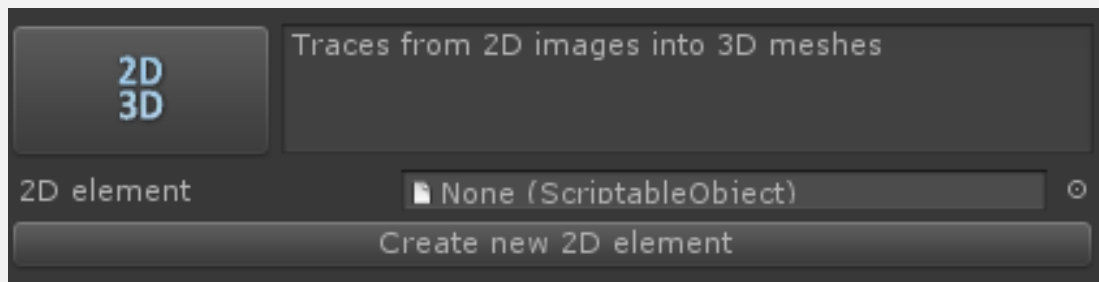


2D to 3D tracing

One of the coolest features of GameDraw is the ability to convert 2D images into meshes that can be then used in your game, it is very easy to turn an image into a mesh and might be as simple as a click but sometimes you will need to modify the properties to get the desired result.

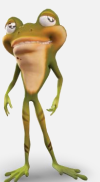
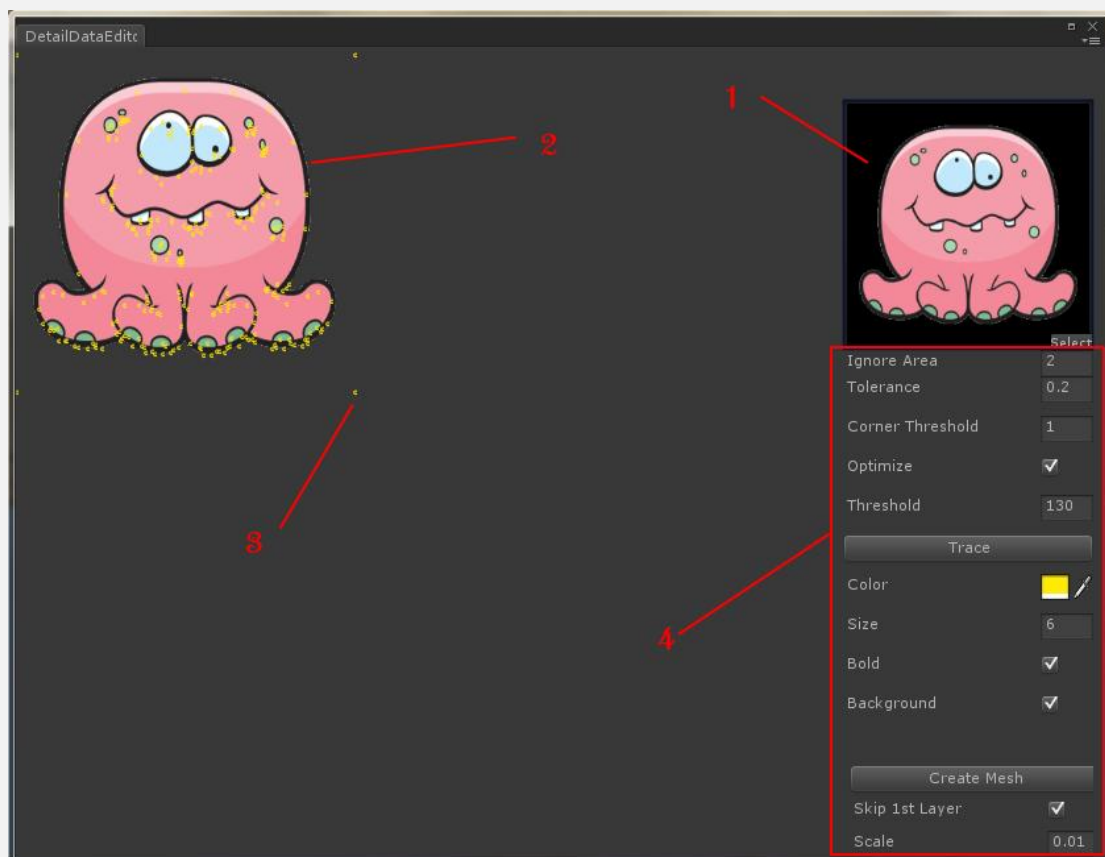
Creating a 2D element

2D elements are the elements how hold data of the traced image, creating a 2D element is simple, just click on the Trace from 2D images to 3D meshes icon to show its list then click on the “Create 2D element” button



Once you click the button a save file dialog will appear, save your element in the desired location with the desired name then you will get the 2D to 3D tracing window to show up.

The following figure shows the tracing editor window.



The following table describes the elements in tracing editor as numbered in the image.

Number	Name	Description
1	Main Texture	This is essential, this is the texture you will trace, try to make the size of it not very big and not very small from the importer settings.
2	Background Texture	Once you select a main texture and the background option is toggled you will get it as a background of the traced points.
3	Movable point	Once you trace the image you should get a set of movable points, these points can be modified as they are drag-able.
4	Trace panel	These are the properties and functions of the tracer; use them to get the best results from your image.

Selecting an image

To select an image to trace just click on the texture slot and you will be prompted to select the texture.

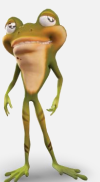
Tracing an image

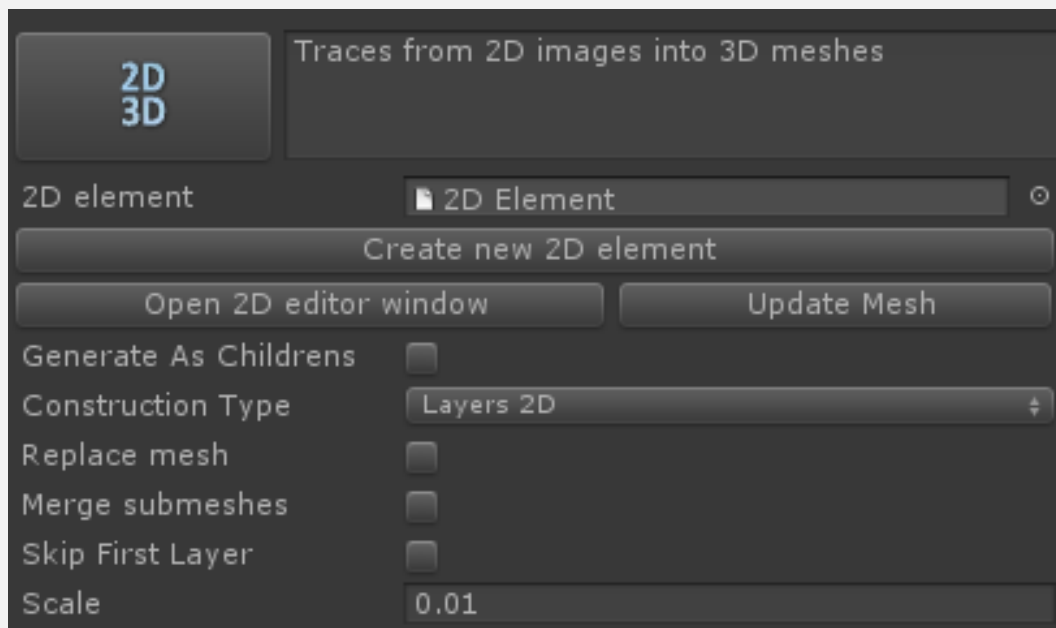
To trace an image simply click on the trace button and the tracer will trace the image and resulting points will be shown in the left side of the tracing window, to customize the tracing result you can change the below properties.

- Ignore area: the neighbor pixels to ignore while tracing
- Tolerance: the tolerance used to compare between pixels
- Corner threshold: the threshold to be used to detect corners.
- Optimize: whether to optimize the number of resulted points or not by reducing them when possible.
- Threshold: Change this value to get different results if you are not getting your desired result.
- Color: the color of the movable points shown in the window.
- Size: the size of the movable points.
- Bold: whether the movable points are bold or not.
- Background: whether to show the background image or not.
- Skip 1st layer: sometimes you will get a square as a mesh when an image is traced, use this option to ignore its generation.
- Scale: the scale of the generated mesh, use this to customize the scale of the mesh generated.

Creating mesh

To create the mesh as a separate GameObject click on "Create mesh" button and a new GameObject in the hierarchy will be constructed, if you want to create it as part of the current mesh then use the settings of the tracer within the utilities tab as described below:





Under the 2D to 3D tracing tab in the utilities tab you can create meshes from a references 2D element file; you can specify the 2D element by selecting it in the 2D element field or by creating a new one.

To modify it click on the “Open 2D editor window” to open the tracing window.

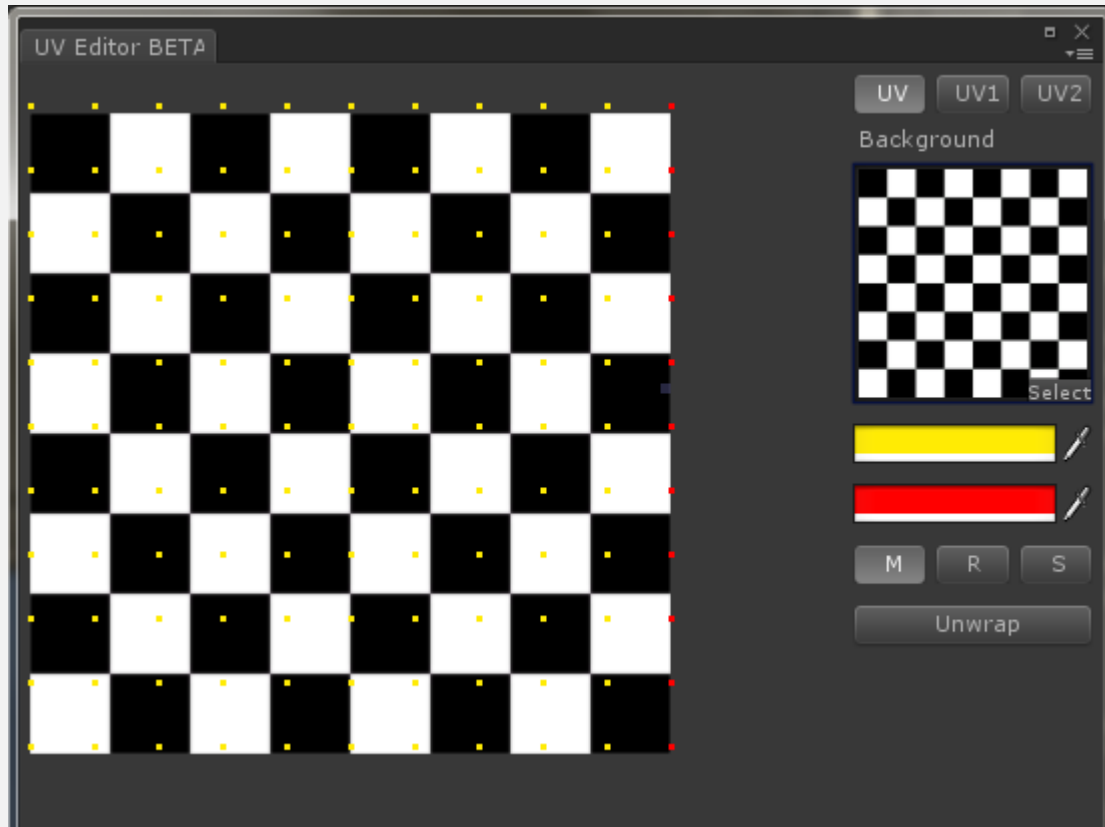
To generate the mesh from the specified 2D element just click on the Update Mesh, the following properties allows you to customize the generation process:

1. Generate as Children: toggle this on to generate each layer of the traced image into a child transform for the current gameObject holding the generated mesh for that layer.
2. Construction type: there is 2 types of construction types the first is the “layers 2D” and the second is the “layers 3D”, with layers 2D you will get a flat mesh, with layers 3D you will get an extruded mesh, if you select Layers 3D a new field will appear below it so you can specify the extrude amount.
3. Replace mesh: toggle this to indicate whether to replace the current mesh or not, note that this does not do anything when “Generate as children” is toggled.
4. Merge submeshes will merge all submeshes into a single submesh when not being generated as children.
5. Skip first layer, toggle this to skip the first layer when generating a mesh, usually this is a square behind your elements.
6. Scale: specify the scale of the mesh, you can grow or shrink the vertices generated depending on this value.



The UV editor

In the UV editor you will be able to edit UV coordinates and unwrap them, to launch the UV editor you can go to GameDraw->UV editor or from the GameDraw window or inspector under the UV tab.



In the UV editor you can simply select UVs through the mouse with the ability to do multi selection and then move the control your UV coordinates, the Unwrap button allows you from unwrapping your UVs, you can also customize the background so you can modify the UVs according to the texture you want to use, all highlighted UVs are also highlighted on the mesh itself in the sceneview so you can see the vertices you are working on.

To change the background simply click on the background slot and select a texture to be used.

Note that rotation and scale are not yet implemented.



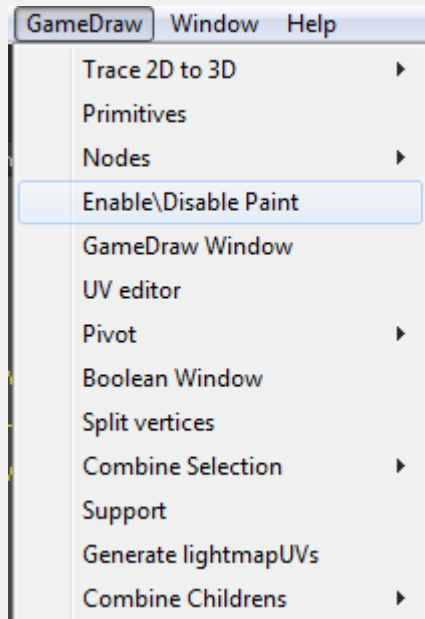
Level painting

It is possible with GameDraw to simply draw\paint your 2D levels in the sceneview and collision added out of the box, this is great for creating 2D games as well as prototyping them.

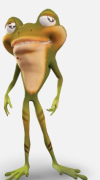
Note that you should not be in an Iso mode window enabling the Paint mode or it won't operate in a correct manner.

Enable/Disable Paint

To enable or disable paint in the sceneview simply go to GameDraw->Enable\Disable Paint



Once you enable the Paint mode you will be able to simply draw shapes inside your sceneview and these shapes will turn into meshes with the specified attributes.



The painter

With the painter window you can control how the paint mode operates and what are the shapes generate by it, you can specify the color for the material, whether the generate object is static or not, you can specify whether to generate a collider or not and if the collider is convex or not also it is possible to indicate that the object should be a rigidbody and the width field is the extrusion amount used to extrude the shape.

To align your main camera to what you see in the sceneview simply click on the “Align Cam” button.

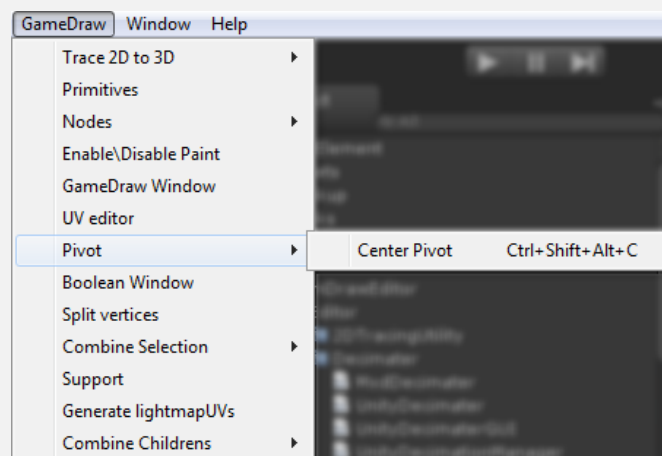


Painting in the SceneView

Once you enable the paint mode your SceneView will be looking at the Z axis and you will be able to simply paint inside it once you click on the mouse the painting process will start and when you release the mouse the object will be create with the specified values in the painter.

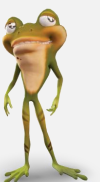
Centering a mesh pivot

To center a mesh pivot you can simply go to GameDraw->Pivot->Center pivot.



Splitting vertices

To make vertices unique and to ensure correct normal you should click on GameDraw->Split vertices from the menu bar, this operation will make each triangle to have his unique vertices hence correct normals.



Combine meshes

With GameDraw you have two types of combine and operates on two sets of objects, the first is per material and this ensures to combine meshes based on materials shared between the objects and makes objects with the same material combined together other than that it does not make a difference, the other “normal” will combine meshes in a normal manner but does not guarantee any performance if the meshes have different materials.

You can combine per selection to do the combine operation on selected objects or on children to combine the children of the current selected transform.

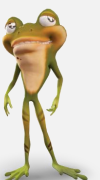
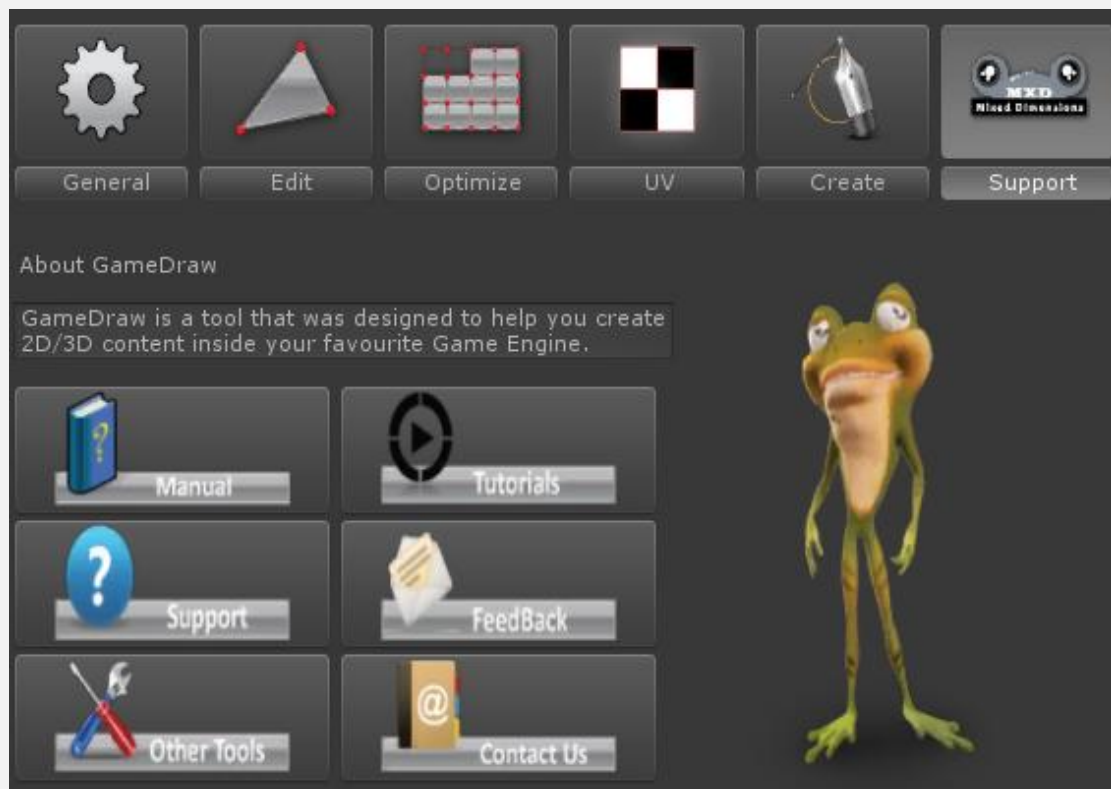
All options can be accessed from the GameDraw menu.

Generate Lightmap UVs

Once you create a mesh and you want to lightmap it then you will need to generate the lightmap UVs, this can be done through the GameDraw menu by clicking on GameDraw-> generate lightmap UVs.

Support

Inside the GameDraw window as well as the inspector there is a support tab and it is there to help you out, it will link you to places where you can learn more about GameDraw or get support from our support team, whenever you face any issue don't hesitate to contact us and we will fix it for you ☺



Contacting the support

You can contact the support from the support tab or through the GameDraw menu, we will help you out and we will make sure any issues you face get solved, use this to report bugs, ask for information or to send us suggestions and feedback, to access it from the menu just go to **GameDraw-> Support** as shown in the below figure.

Contact Us

Please feel free to contact us anytime and whenever you want, we are looking forward to hear from you and to get your feedback.



Support

support@mixeddimensions.net

Sales

sales@mixeddimensions.net

GameDraw

www.gamedraw3D.com

Mixed Dimensions

www.mixeddimensions.net

