2D Level Creator

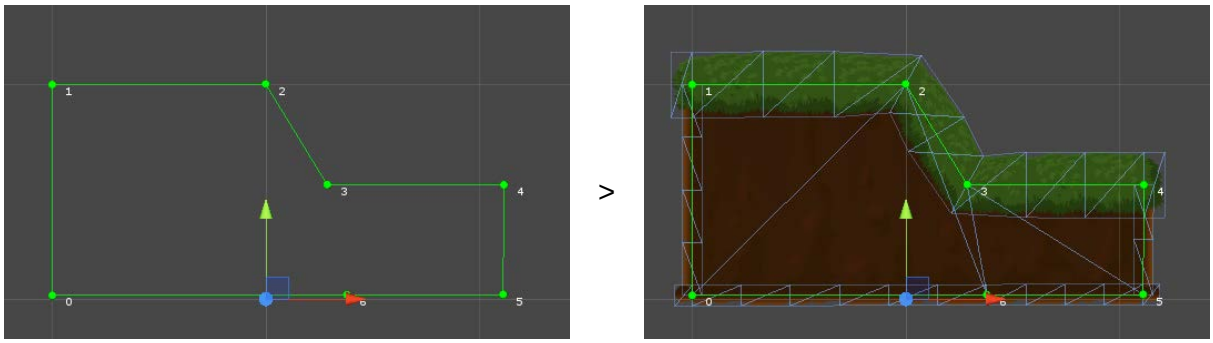
1 CONTENT

2 DESCRIPTION

2D Level Creator is a tool to create levels of 2D games in Unity. Allows you to create complete terrains composed of trees, walls, stones, stairs and an infinite number of objects whose material has been provided.

The function of the tool is to form a material from the images provided and apply this material according to the parameters entered to polygon created by the developer using the points system that offers.

The aim of this tool is to save the maximum time possible in the creation of levels for 2D games so that the developer can quickly create any kind of terrain through the union of a set of reference points.



The tool is located in the directory **/Assets/2DLC** and contains the following subdirectories:

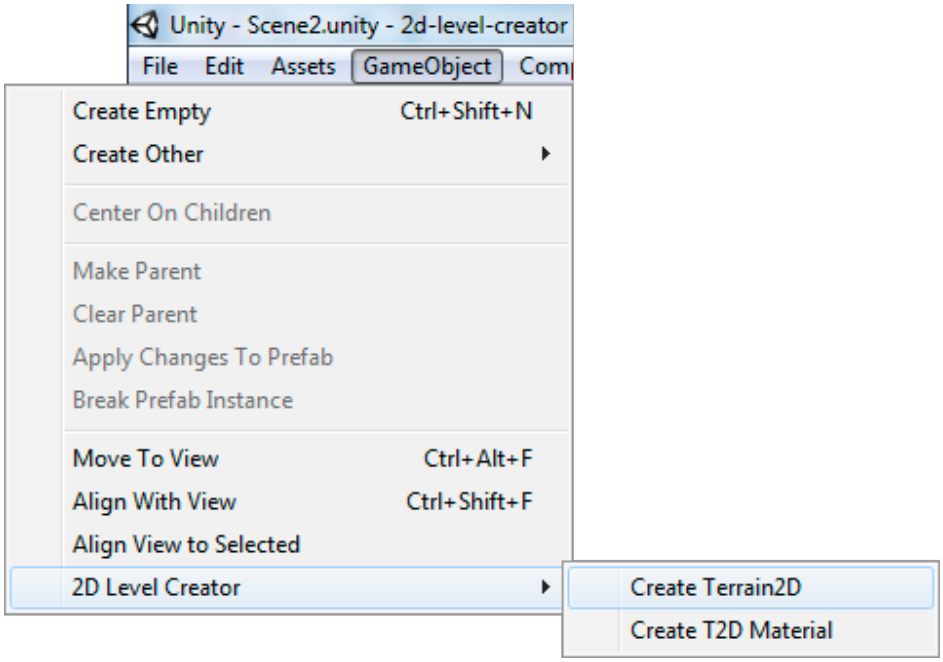
- **MATERIALS:** Contains custom materials (.mat).
- **MATERIALS_AUTO:** Contains materials (.mat) generated automatically. All files in this directory have its corresponding T2DMaterial in the directory **/Assets/2DLC/Prefabs**. Those who are not associated are periodically removed. It is not recommended to use this directory for another purpose.
- **PREFABS:** Contains those prefabricated of the tool among them is located the T2DMaterials.
- **RESOURCES:** Contains the different resources of the tool. These resources must not be moved since some are required by the code of the tool.
- **SCRIPTS:** Contains all the code of the tool.
- **SHADES:** Contains some shadows recommended for materials (.mat).
- **SPRITES:** Contains images of materials.
- **EXAMPLES:** Contains various examples that illustrate the use and capacity of the tool, the scenes are in the directory **/Assets/2DLC/Examples/Scenes**.

3 TERRAIN2D

Terrain2D is the base component of the tool, from which you create all the objects in the level.

To create a new terrain:

GameObject > 2D Level Creator > Create Terrain2D



Then a chooser is deployed to assign a **T2DMaterial** to the terrain.

3.1 T2DMATERIAL

T2DMaterial is the first parameter that receives the terrain, contains all images and materials needed for the modeling of the terrain. Currently available 2 types: Terrain and Component.

Depending on the type selected, will exist or not some parameters of the terrain.

3.2 Auto Renderer Materials

This option automatically specifies the materials (.mat) associated with the selected T2DMaterial for the MeshRenderer Component. Commissioning False, only then it allows to manually modifying these materials. The aim is that can be generated different materials (.mat) for the same T2DMaterial, always taking into account that the sprites of the current T2DMaterial are to be applied.

3.3 Scene Tools

It gathers all the settings of view, below is a brief description of each option.

3.3.1 Polygon Line

The polygon line is used to draw the terrain to see the shape of the points introduced. It has the following parameters:

- **Show:** Show/Hide polygon line.
- **Color:** Color of polygon line.

3.3.2 Point Number

The point number is used to indicate the position of a point in the scene.

- **Enabled:** Enable/Disable point number.
- **Size:** Size of point number.
- **Color:** Color of point number.

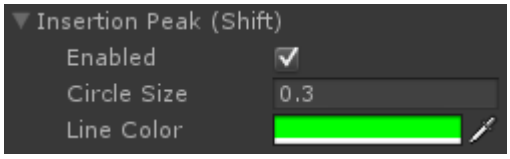
3.3.3 Motion Point

The point of movement is the essential element of the terrain. In fact the terrain is formed by the union of points.

- **Enabled:** Enable/Disable motion point.
- **Size:** Size of movement point.
- **Color:** Color of movement point.

3.3.4 Insertion Peak (Shift)

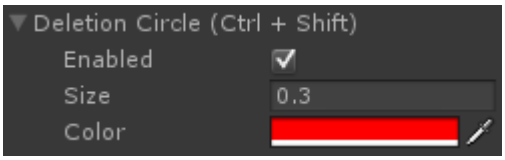
The peak of inclusion is displayed when the key **Shift** is pressed and used to insert a new point on the scene.



- **Enabled:** Enable/Disable insertion peak.
- **Circle Size:** Circle size of insertion peak.
- **Line Color:** Line color of insertion peak.

3.3.5 Deletion Circle (Ctrl + Shift)

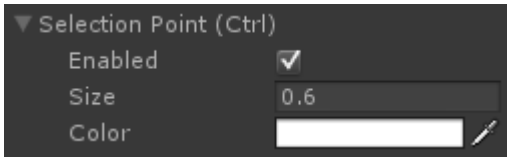
The circle of elimination is shown when the keys **Ctrl** and **Shift** are pressed and serves to delete a point on scene.



- **Enabled:** Enable/Disable deletion circle.
- **Size:** Size of deletion circle.
- **Color:** Color of deletion circle.

3.3.6 Selection Point (Ctrl)

Allows selecting points when the key **Ctrl** is pressed to then apply the common functions as move or delete.



- **Enabled:** Enable/Disable selection point.
- **Size:** Size of selection point.
- **Color:** Color of selection point.

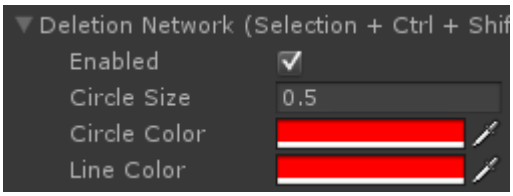
3.3.7 Motion Network (Selection)

Is displayed when a selection of points is made and allows you to move all selected points in the same direction.

- **Enabled:** Enable/Disable movement network.
- **Line Color:** Line color of motion network.

3.3.8 Deletion Network (Selection + Ctrl + Shift)

Is shown when performing a selection and are pressed the keys **Ctrl** and **Shift**, is used to remove all selected points.



- **Enabled:** Enable/Disable network of elimination.
- **Circle Size:** Circle size of deletion network.
- **Circle Color:** Circle color of deletion network.

- **LINE COLOR:** Line color of deletion network.

3.3.9 RESET SCENE TOOLS

Reset all options of view.

3.4 TERRAIN MODE

Defines the terrain mode and contains 2 options:

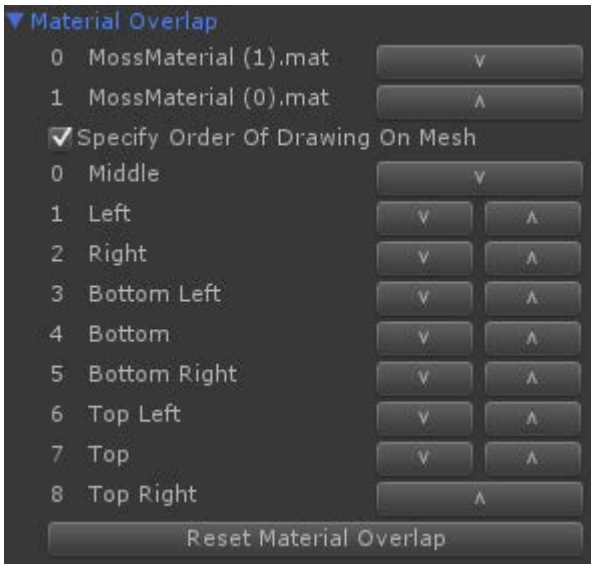
- **FILLED:** It is the mode that is selected by default and means that the terrain will internally regarding the points system.
- **INVERTED:** Contrary to FILLED, the terrain will be formed outside the points system. When you select this option, the parameter **Investment Distance** is exposed to indicate the margin of the terrain walls.

3.5 PIXELS PER UNIT

It is the scale of pixel equivalent to a unit on the scene. 100 pixels per unit would mean that a Sprite of 100 pixels is considered a unit on the scene. It affects both physics and the quality of the terrain.

3.6 MATERIAL OVERLAP

It allows you to configure the superimposition of materials (.mat) and the order of the different parts of selected T2DMaterial during rendering (drawing in mesh). Contains the following options:



- **SPECIFY ORDER OF DRAWING ON MESH:** Enable/Disable overlap configuration of drawing in mesh.
- **RESET MATERIAL OVERLAP:** Reset the superimposing of materials and the order of drawing in mesh.

3.7 Material Options

Allows the configuration of the different parts of the selected T2DMaterial.

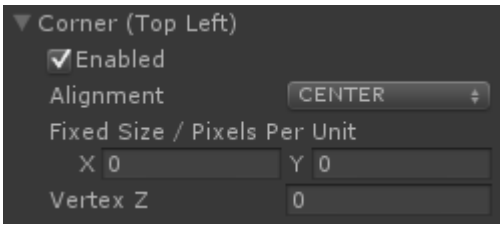
3.7.1 Edge Mode

Indicates how the edges relate to each other and contains 2 options:

- **DETACHED:** Means that the opposite sides of the edges are independent.
- **CONCATENATED:** Means that the opposite sides of the edges will be concatenated.

3.7.2 Corner

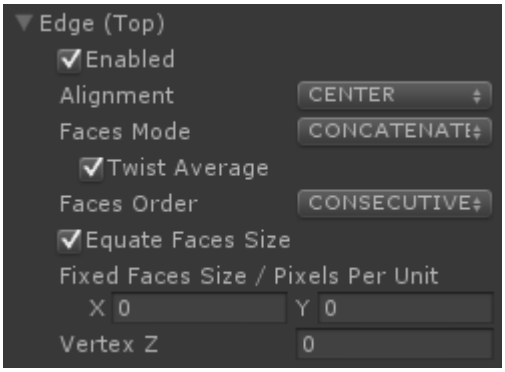
Each corner of the terrain (**TopLeft**, **TopRight**, **BottomLeft** or **BottomRight**) contains its own configuration and is composed of an image and has the following parameters:



- **Enabled:** Enable/Disable the corner.
- **Alignment:** Alignment of the corner in relation to the line of terrain, can be one of the following options:
  - **CENTER:** Corner is centered with respect to the terrain line.
  - **HIGH:** Corner is high with respect to the terrain line.
  - **SUNK:** Corner is sunken on the terrain line.
- **Fixed Size / Pixels Per Unit:** This parameter enables you to set the size of the corner to the specified size. The entered value is divided by the number of pixels per unit.
- **Vertex Z:** Allows to set the depth of the corner through the application of the value entered to the z-axis of all vertices.

3.7.3 Edge

Each edge of the T2DMaterial selected (**Top**, **Bottom**, **Left** or **Right**) has one or more images and its own configuration with the following parameters:

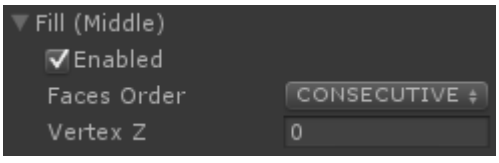


- **Enabled:** Enable/Disable edge.

- **ALIGNMENT:** Alignment of the edge in relation to the line or the polygon of terrain, can be one of the following options:
    - **CENTER:** Edge is centered with respect to the terrain line.
    - **HIGH:** Edge is high with respect to the terrain line.
    - **SUNK:** Edge is depressed on the terrain line.
- **FACES MODE:** Faces mode indicates if the edge faces are concatenated or independent.
    - **CONCATENATED:** concatenated faces share their sides so that the right side of the face 1 is the left side of the face 2. This option exposes the parameter **Twist Average** which if set to True, allows to adjust the sides shared in bends.
    - **INDEPENDENT:** Independent faces have each their own sides. This could be more expensive at the level of memory but it could also provide higher quality. Logically when this option is used will appear cuts between faces and for this reason is exposed the parameter **Include Corners Between Cuts** which if set to True, allows to create corners for these cuts.
- **FACES ORDER:** The order of faces has 3 options:
    - **CONSECUTIVE_BETWEEN_TWO_POINTS:** The consecutive order between two points consists in using the images provided to the edge consecutively between two points and start again at the next point.
    - **CONSECUTIVE_AT_TERRAIN_LEVEL:** The consecutive order at terrain level consists in using the images provided to the edge consecutively at the terrain level.
    - **RANDOMIZED_CONTROLLED:** The controlled random order is to use randomly the images provided to the edge recalling always the generated positions. This option exposes the button **Refresh Random Order** to regenerate the positions.
- **FACES EQUATE SIZE:** Given that the sides can vary in size, this option allows to match the size of all sides to a medium size. So a border composed of 2 faces, face 1 with 50x50 and face 2 with 100x100, the resulting size would be 75x75 for all faces.
- **FACES FIXED SIZE / PIXELS PER UNIT:** This parameter enables you to set the size of all the faces to the specified size. The entered value is divided by the number of pixels per unit. It should be noted that the width (**X**) is not taken into account when the size of the faces has been matched by **Equate Faces Size**.
- **VERTEX Z:** Allows to set the depth of the edge through the application of the value entered to the z-axis of all vertices.

3.7.4 FILL

The filling has one or more images and the following configuration parameters:

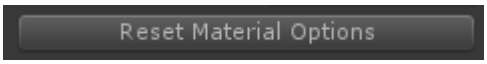


- **ENABLED:** Enable/Disable fill.
- **FACES ORDER:** The order of faces has 2 options:
    - **CONSECUTIVE:** The consecutive order consists in using consecutively the images provided to the fill.

    - **RANDOMIZED_CONTROLLED:** The controlled random order is to use randomly the images provided to the fill recalling always generated positions. This option exposes the button **Refresh Random Order** to regenerate the positions.
- **VERTEX Z:** Allows to set the depth of the fill by applying the value entered to the z-axis of all vertices.

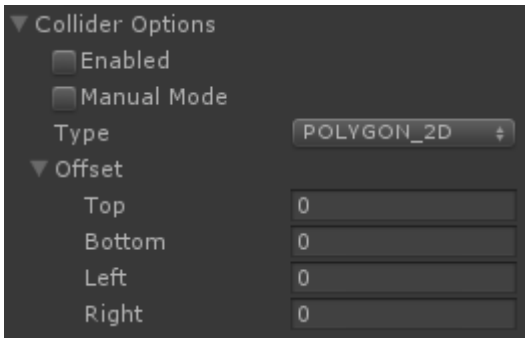
3.7.5 RESET MATERIAL OPTIONS

Reset all options of the block “Material Options”.



3.8 COLLIDER OPTIONS

It is obviously the Collider suitable for the terrain configuration. Once enabled and by default creates a Collider of type POLYGON_2D in mode automatic (the Collider will use the polygon of the ground and will adapt to the changes of this). This default state can be modified using the following parameters:



- **ENABLED:** Enable/Disable the collider.
- **MANUAL MODE:** The manual mode, if enabled, creates an independent polygon for the collider (not updated with the terrain) and exposes the option **Edit On Scene** that once enabled allows you to modify this polygon points in scene. Are also shown the editable points of the generated polygon and the button **Reset Collider Points** used to restore the generated polygon to the terrain polygon.
- **TYPE:** It's the type of collider, currently there are available 3 types:
    - **POLYGON_2D:** Use component UnityEngine.PolygonCollider2D.
    - **EDGE_2D:** Use component UnityEngine.EdgeCollider2D.
    - **MESH:** Use the component UnityEngine.MeshCollider.
- **MESH TYPE:** The type of mesh only exists for the terrain whose T2DMaterial is a component and contains 2 options:
    - **LINE:** The Collider will be open, a line is generated through the points of this collider.
    - **FORM:** The Collider will be closed, a polygon is generated through the points of this collider. In this case is exposed the option **Use All Vertices** that allows to use all the vertices of the terrain for the collider polygon.
- **OFFSET:** Is a margin to the vertices of the collider. It is not used in manual mode.

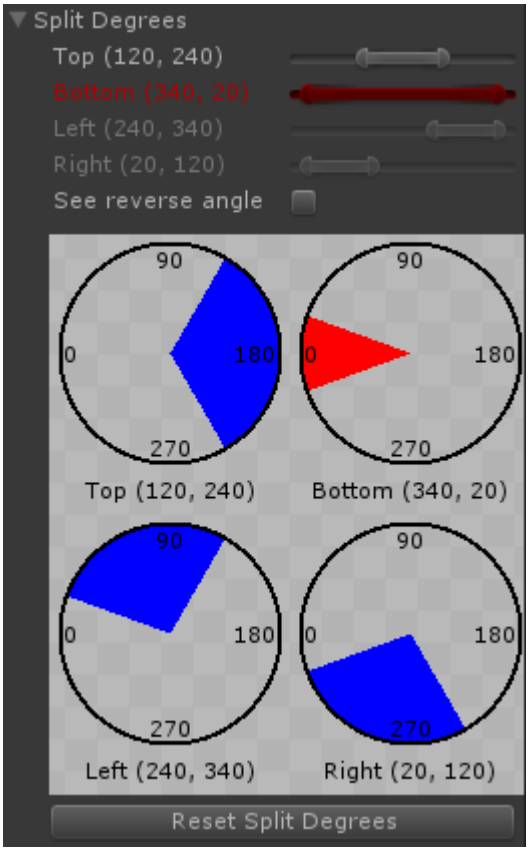
3.9 Turning Ability

Each side of edges and corners is conditioned by the previous and next side so that one side can be tilted more or less according to these to suit your situation, the turning ability tries to control this inclination. This significantly affects the thickness of edges and corners. Only has 2 parameters:

- **X:** Ability to turn or tilt in the x axis.
- **Y:** Ability to turn or tilt in the y axis.

3.10 Split Degrees

The terrain is initially composed of a polygon, this polygon is formed by many sides, each one of them has a different slope and is precisely this inclination that indicates what the type of edge. With this tool, the developer can decide the rules of the terrain, indicate when one side of the polygon is considered floor, ceiling or wall.



- **Top:** The range of degrees to consider that a side of the polygon is a soil (**upper part of** T2DMaterial).
- **Bottom:** The range of degrees to consider that a side of the polygon is a ceiling (**lower part of** T2DMaterial). The degrees of this option are reversed (360-0), since the value is from the end to the beginning.
- **Left:** The range of degrees to consider that a side of the polygon is a right wall (**left part of** T2DMaterial).
- **Right:** The range of degrees to consider that a side of the polygon is a left wall (**right part of** T2DMaterial).

- **SEE REVERSE ANGLE:** Given that the terrain can change the mode, the parameters of split degrees can be somewhat confusing. This option allows to invert the graph to see the result of different ways.
- **RESET SPLIT DEGREES:** Reset the parameters of split degrees.

3.11 SOLVE TANGENTS

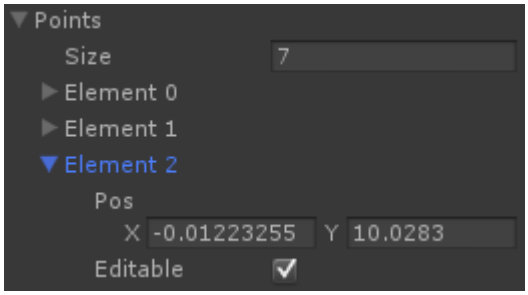
Allows to solve the tangent of the terrain mesh.

3.12 RENDER

Allows to render the terrain.

3.13 POINTS

It contains all points of the terrain and allows to make them editable.



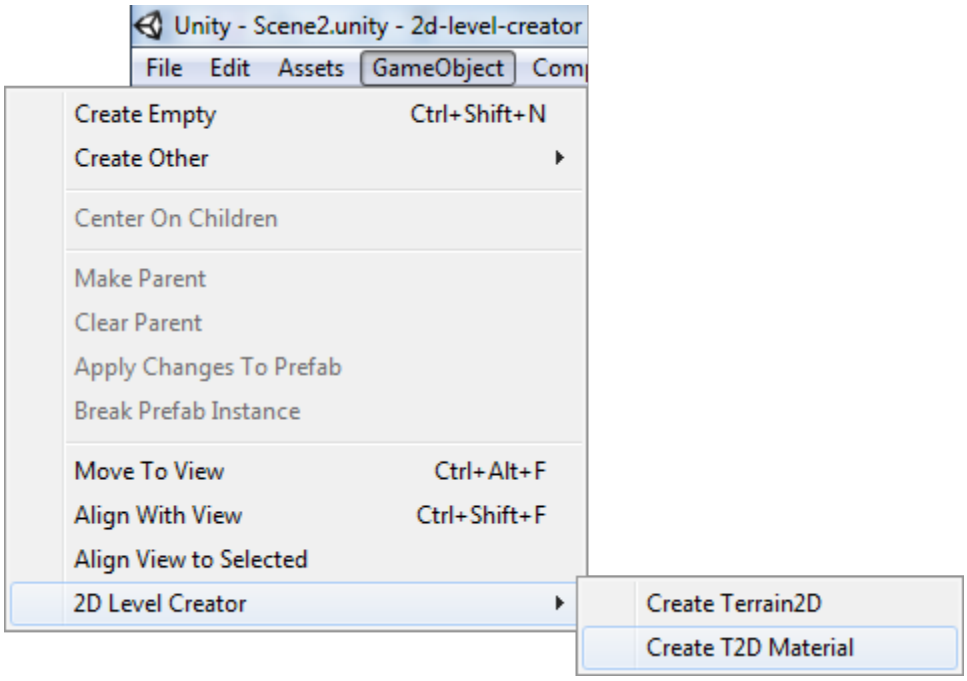
4 T2DMATERIAL

T2DMaterial is the material of terrain, a component that includes all necessary images of classified and parameterized way for the terrain. It is also responsible for generating from the provided images the required materials (.mat) for the terrain mesh.

By default is created in the directory **/Assets/2DLC/Prefabs** although you can refer to a T2DMaterial that is located in a different location.

To create a new T2DMaterial:

GameObject > 2D Level Creator > Create T2D Material

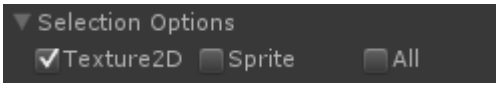


4.1 MATERIAL TYPE

This type is also considered the type of terrain and has an impact on the parameters of the terrain that makes use of this T2DMaterial. Currently there are two types:

- **TERRAIN:** It is designed to create a complete terrain with floors, walls, ceiling and filling.
- **COMPONENT:** Intended for the different complements of terrain such as a ladder, a pipe or trees.

4.2 MATPART SELECTOR



Contains a component to specify the type of resource to display in the chooser when the button **select** is pressed.

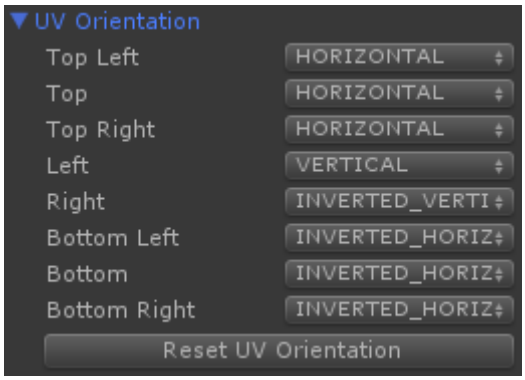
And the selector of the different parts of T2DMaterial which includes all the required images for the terrain and is divided into the following parts:

- **TOP LEFT:** Left top corner, is composed of an image.
- **TOP RIGHT:** Right upper corner, is composed of an image.
- **BOTTOM LEFT:** Left bottom corner, is composed of an image.
- **BOTTOM RIGHT:** Right bottom corner, is composed of an image.
- **TOP:** Top edge, is composed of one or several image.
- **LEFT:** Left edge, is composed of one or several image.
- **RIGHT:** Right edge, is composed of one or several image.
- **BOTTOM:** Bottom, is composed of one or several image.
- **FILL:** Filling, is composed of one or several image.

Depending on the material type selected, will exist or not some parts.

4.3 UV ORIENTATION

Allows you to change the orientation of the parts of T2DMaterial, thus facilitating the reuse of images from different parts and with different orientations.

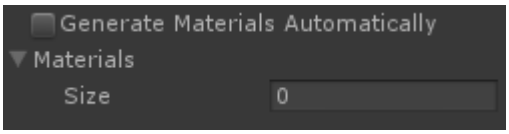


- **TOPLEFT, TOP, TOPRIGHT, LEFT, RIGHT, BOTTOMLEFT, BOTTOM, BOTTOMRIGHT:**
  For each part of T2DMaterial are exposed the following states:
  - **HORIZONTAL:** Indicates that images of this part are horizontal. It is the default state of the parts **Top**, **TopLeft** and **TopRight**.
  - **INVERTED_HORIZONTAL:** Indicates that images of this part are inverted horizontally. It is the default state of the parts **Bottom, BottomLeft** and **BottomRight**.
  - **VERTICAL:** Indicates that images of this part are vertically. It is the default state of the part **Left**.

- **INVERTED_VERTICAL:** Indicates that images of this part are inverted vertically. It is the default state of the part **Right**.

- **RESET UV ORIENTATION:** Reset the orientation of all parts of T2DMaterial.

4.4 GENERATE MATERIALS AUTOMATICALLY



Enabled, allows to automatically generate the materials (.mat) needed for the terrain mesh, these materials are stored in the directory **/Assets/2DLC/Materials_Auto** where it must remain.
Otherwise are removed the materials automatically generated and will be exposed the parameter **Materials** to specify custom materials.

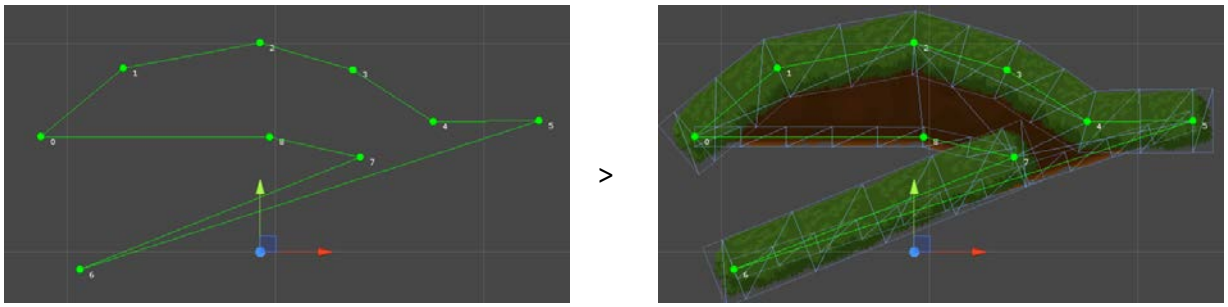
5 USAGE TIPS

5.1 MAIN KEYS ON SCENE

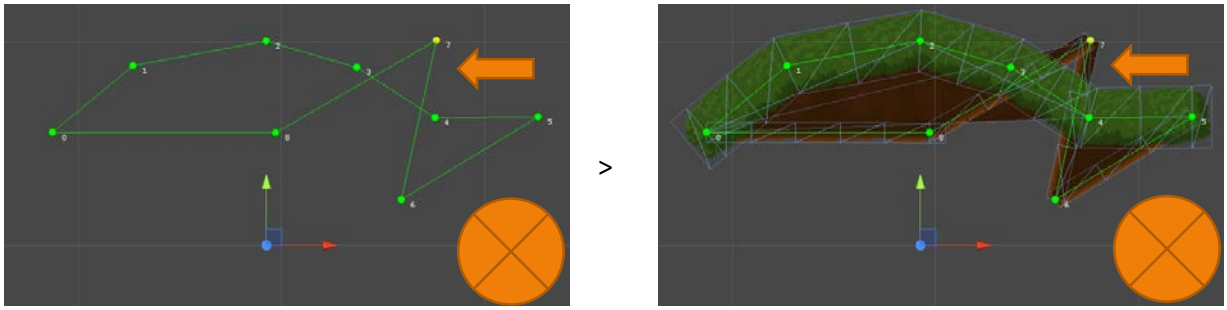
(Shift) To insert a new point
(Ctrl + Shift) To delete a point
(Ctrl) To select point/s
(Selection + Ctrl + Shift) To delete selected points

5.2 PROPER CONSTRUCTION OF POLYGON

Usually you can create any shape:



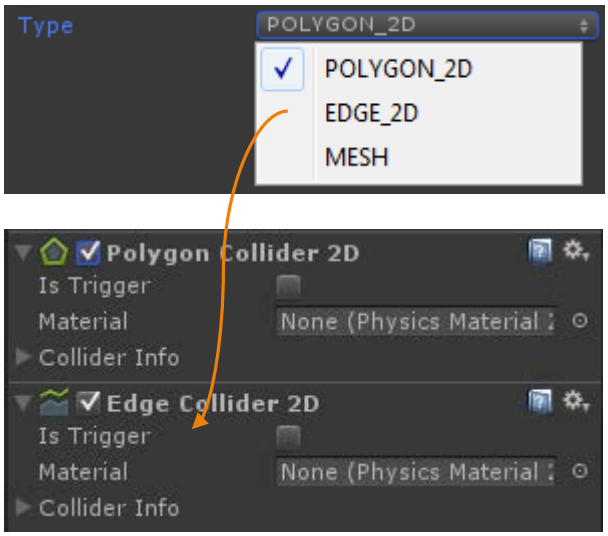
Provided that there is no intersection in the polygon:



5.3 USE 2D COLLIDERS

Because the 2d colliders (**PolygonCollider2D** and **EdgeCollider2D**) have their own point system, we recommend you close these components during development of the terrain to avoid confusion. Note that the changes made with this system are not valid for our terrain.

To modify the points of this collider is used the option **Collider Options > Manual Mode > Edit On Scene**.
Do not forget to disable this option when the modification is complete, to handle again the terrain points.



Also keep in mind that when type changes between 2d colliders are made, the object retains both to allow use them in conjunction. So if you do not want to use both, do not forget to remove the unwanted collider.