



DIGGABLE TERRAINS 2D

version 2.1.0

Manual

Introduction

This package enables you to easily create immersive environments where terrains are modifiable in runtime. With a wide range of options, it allows you to create terrains of any shape, style and scale.

You are currently reading the manual, which provides information about components, settings, and editors. However, once you have finished this one, you can move on to the Scripting API to start digging!

Topics

[Getting Started](#)

[Polygon Terrain 2D](#)

[Runtime Save Options](#) (added in v2.1.0)

[Voxel Terrain 2D](#)

[Runtime Save Options](#) (added in v2.1.0)

[Terrain Layer](#)

[Terrain Splat Map](#)

[Shovel](#)

[Box Shape 2D](#)

[Circle Shape 2D](#)

[Polyline Shape 2D](#)

[Spline Shape 2D](#)

[Polygon Terrain 2D vs Voxel Terrain 2D](#)

[Notes](#)

[Links & Contact Info](#)

Getting Started

1. Create a new GameObject and select it.
2. Click on "**Add Component**" in the Inspector window.
3. Select "**Script Boy > Diggable Terrains 2D > Terrains > Polygon Terrain 2D**".
4. In the Polygon Terrain 2D component, click the "**New Shape**" button and choose "**Box Shape 2D**" from the menu.
5. Create a new GameObject and select it.
6. Click on "**Add Component**" in the Inspector window.
7. Select "**Script Boy > Diggable Terrains 2D > Shovel**".
8. In the Shovel component, click the "**New**" button next to the Shape property and choose "**Circle Shape 2D**" from the menu.
9. In the Shovel component, set the "**Enable Demo**" to true.
10. Enter play mode!

These steps should help you get started. However, for more information, please refer to the next pages.

Polygon Terrain 2D

Description

The Polygon Terrain 2D component creates terrains based on polygons.

Add Component Menu

Component > Script Boy > Diggable Terrains 2D > Terrains > Polygon Terrain 2D

Properties

Sorting Layer	Name of the Renderer's sorting layer.
Order in Layer	Renderer's order within a sorting layer.
Simplification	The simplification threshold.
Is Diggable	Is the terrain diggable in runtime?
Is Fillable	Is the terrain fillable in runtime?
Enable Holes	By default, you can only dig along the edges. However, if you enable this feature, you can also create holes.
Enable Physics	This feature adds a Rigidbody2D component to terrains that do not have anchors.
Use Delaunay	Using the Delaunay algorithm to create a high-quality mesh.
Edge Height	The height of the edges.
Edge Offset	The offset of the edges.
Edge Corner Type	To handle sharp corners, you have three options: Simple: No changes are made to the corners. Normal: Two points are added to the corners. Rounded: N points are added to make the corners rounded.
Edge UV Mapping	Choose X for horizontal texture mapping, Y for vertical mapping, and XY for both axes.
Collider Offset	The offset of the colliders.
Layers	You can set the colors and textures of terrains, with a maximum of 4 layers.
Splat Map Texture	The texture of the Splat Map.
Splat Map UV Rect	The texture coordinates of the Splat Map.
Anchors	When Physics is enabled, you can use anchors to pin certain terrains and make them static.

Runtime Save Options (added in v2.1.0)

Customize how Polygon Terrain 2D data is collected when you use the Save or GetData methods during runtime.

Compression Method	Compression method used when saving data. (NoCompression, Deflate, GZip, Brotli)
Compression Level	Compression level used when saving data. (Optimal, Fastest)
Include Splat Map	Whether to include the splat map in the save data.
Compress Splat Map	Whether to compress the splat map in the save data.

Notes

Polygons cannot be compressed too much!

The **Texture2D.Compress** method is used to compress the **Splat Map**. Be aware that this may result in a loss of texture quality.

The **Brotli** compression method with the **Optimal** level may yield the smallest date size but is also the slowest method.

You can use the **Test** button to view **Saving Duration**, **Loading Duration**, and **Data Size**.

Voxel Terrain 2D

Description

The Voxel Terrain 2D component creates terrains based on voxel maps.

Add Component Menu

Component > Script Boy > Diggable Terrains 2D > Terrains > Voxel Terrain 2D

Properties

Sorting Layer	Name of the Renderer's sorting layer.
Order in Layer	Renderer's order within a sorting layer.
Simplification	The simplification threshold.
Is Diggable	Is the terrain diggable in runtime?
Is Fillable	Is the terrain fillable in runtime?
Edge Height	The height of the edges.
Edge Offset	The offset of the edges.
Edge Corner Type	To handle sharp corners, you have three options: Simple: No changes are made to the corners. Normal: Two points are added to the corners. Rounded: N points are added to make the corners rounded.
Edge UV Mapping	Choose X for horizontal texture mapping, Y for vertical mapping, and XY for both axes.
Collider Offset	The offset of the colliders.
Layers	You can set the colors and textures of terrains, with a maximum of 4 layers.
Splat Map Texture	The texture of the Splat Map.
Splat Map UV Rect	The texture coordinates of the Splat Map.
Voxel Map Width	The width of the voxel map.
Voxel Map Height	The height of the voxel map.
Voxel Map Transform	Choose between Auto or Manual mode. In Auto Transform mode, the position and scale of the voxel map are automatically calculated based on the bounds containing all shapes, with an optional padding. In Manual Transform mode, you will have to set the position and scale manually.
Voxel Map Padding	In Auto Transform mode, it is used as an offset between the map bounds and shapes.
Voxel Map Position	In Manual Transform mode, set the position of the voxel map.
Voxel Map Scale	In Manual Transform mode, set the scale of the voxel map.

Runtime Save Options (added in v2.1.0)

Customize how Voxel Terrain 2D data is collected when you use the Save or GetData methods during runtime.

Compression Method	Compression method used when saving data. (NoCompression, Deflate, GZip, Brotli)
Compression Level	Compression level used when saving data. (Optimal, Fastest)
Include Splat Map	Whether to include the splat map in the save data.
Compress Splat Map	Whether to compress the splat map in the save data.

Notes

- # The **Texture2D.Compress** method is used to compress the **Splat Map**. Be aware that this may result in a loss of texture quality.
- # The **Brotli** compression method with the **Optimal** level may yield the smallest date size but is also the slowest method.
- # You can use the **Test** button to view **Saving Duration**, **Loading Duration**, and **Data Size**.

Terrain Layer

Description

A layer describes textures and colors of terrains. You can add a maximum of 4 layers, which will be blended by the Splat Map.

Properties

Fill Color	The color of terrain fill.
Fill Texture	The texture of terrain fill.
Fill Rect	The offset and scale of fill texture.
Edge Color	The color of terrain edge.
Edge Texture	The texture of terrain edge.
Edge Rect	The offset and scale of edge texture.

Terrain Splat Map

Description

When you create a terrain with multiple layers, the Splat Map section will be visible in the Inspector window. It is used to blend layers of terrains.

Editor

New

Click the 'New' button to create a texture with custom size.

Transform

Once you have created the texture, click the "Transform" button to edit the position and size of the map. Make it as large as possible to cover all terrains because once you start painting, you cannot change the transform. Otherwise, you will have to repaint it again.

Paint

Click the "Paint" button, set your brush settings, then start painting by left mouse button. You can change the brush size by holding the "Alt" button and moving your mouse.

Shovel

Description

The Shovel component is responsible for modifying terrains in runtime. It utilizes a Shape2D component to create a polygon, which is then used to dig terrains.

Add Component Menu

Component > Script Boy > Diggable Terrains 2D > Shovel

Editor

Click the "**New**" button next to the Shape property to create a shape.

Properties

Shape	The shape is used to create the shove polygon.
Simplification	The simplification threshold.
Enable Demo	Enables a quick demo for testing the dig function.
Enable Wave	Enables an effect that randomizes the shovel polygon.
Wave Length	The length of the wave.
Wave Amplitude	The amplitude of the wave.

Box Shape 2D

Description

The Box Shape 2D component creates a simple or rounded box.

Add Component Menu

Component > Script Boy > Diggable Terrains 2D > Shapes > Box Shape 2D

Editor

Click the **Edit Mode** button to enable editor handles.

To snap a handle, hold the **Ctrl** button.

Properties

Fill	Set 'true' to fill areas, set 'false' to remove areas.
Width	The width of the box.
Height	The height of the box.
Corner Radius	The radius used to round the corners.
Corner Point Count	The number of additional points that are added to round the corners.

Circle Shape 2D

Description

The Circle Shape 2D component creates a circle.

Add Component Menu

Component > Script Boy > Diggable Terrains 2D > Shapes > Circle Shape 2D

Editor

Click the **Edit Mode** button to enable editor handles.

To snap a handle, hold the **Ctrl** button.

Properties

Fill	Set 'true' to fill areas, set 'false' to remove areas.
Radius	The radius of the circle.
Point Count	The number of points that form the circle.

Polyline Shape 2D

Description

The Polyline Shape 2D component creates lines with adjustable thickness. Additionally, you can set the “Loop” property to true, which turns it into a closed shape.

Add Component Menu

Component > Script Boy > Diggable Terrains 2D > Shapes > Polyline Shape 2D

Editor

Click the **Edit Mode** button to enable editor handles.

To snap a handle, hold the **Ctrl** button.

To delete a handle, right-click on it and then choose **Delete** from the menu that appears.

To add a handle, move your mouse over a line segment and then drag the new transparent handle that appears.

Properties

Fill	Set 'true' to fill areas, set 'false' to remove areas.
Loop	Connects the first and last control points to create a closed shape.
Thickness	The thickness of the polyline. (When the loop is false)
Cap Point Count	The number of points that are added to round the start and end of the polyline. (When the loop is false)
Corner Point Count	The number of additional points that are added to round the corners.
Corner Radius	The radius used to round the corners.
Control Points	The main points of the polyline.

Spline Shape 2D

Description

The Spline Shape 2D component creates curved lines with adjustable thickness. Additionally, you can set the “Loop” property to true, which turns it into a closed shape.

Add Component Menu

Component > Script Boy > Diggable Terrains 2D > Shapes > Spline Shape 2D

Editor

Click the **Edit Mode** button to enable editor handles.

A **Control** handle is represented by a **Sphere**, serving as the position of a control point.

A **Tangent** handle is represented by a **Cone**, serving as the in or out tangent of a control point.

To snap a handle, hold the **Ctrl** button.

To delete a **Control** handle, right-click on it and then choose **Delete** from the menu that appears.

To add a **Control** handle, move your mouse over a curve segment and then drag the new transparent handle that appears.

To reset tangents, hold the **Alt** button and then drag the **Control** handle.

To break the tangent connection, hold the **Alt** button and then drag the **Tangent** handle.

Properties

Fill	Set 'true' to fill areas, set 'false' to remove areas.
Loop	Connects the first and last control points to create a closed shape.
Thickness	The thickness of the polyline. (When the loop is false)
Cap Point Count	The number of points that are added to round the start and end of the polyline. (When the loop is false)
Mid Point Count	The number of points between two control points.
Control Points	The main points of the spline.

Polygon Terrain 2D vs Voxel Terrain 2D

Common Features

1. They are diggable.
2. They are fillable.
3. They support holes.
4. They support multiple layers.
5. They have the same edge settings.
6. They have the same scripting APIs.

Differences

0. The Polygon Terrain 2D uses the Polygon Clipping algorithm, while the Voxel Terrain 2D uses the Marching Squares algorithm.
1. The Polygon Terrain 2D uses less memory compared to voxel maps.
2. The Polygon Terrain 2D has the Physics feature.
3. The Polygon Terrain 2D may have some degenerate cases.
4. The Voxel Terrain 2D has more stable performance with almost no degenerate cases.
5. The Voxel Terrain 2D automatically creates multiple chunks, making it more suitable for large terrains.

Notes

1. If you want to use the fill function, create only one terrain component per scene.
2. If you want more terrains, create more shapes instead.
3. If you are creating a large world, use only a Voxel Terrain 2D component.
4. Do not create a prefab of a terrain component.
6. In some projects, the Polygon Terrain 2D is a good choice, while in others, the Voxel Terrain 2D is preferred. However, in general, the Voxel Terrain 2D is considered the best option. The Polygon Terrain 2D is more like a legacy system from the first version.

Links & Contact Info

<https://youtube.com/DiggableTerrains2D>

ScriptBoyTools@outlook.com

ScriptBoyUnity@gmail.com

Have Fun!
Script Boy
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