My Project

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Chapter 1

Main Page

1.1 Introduction

Structure 2D is a Framework to create Cell Map based games like **Terraria** or **Starbound**.
The main reason I have built Structure 2D was the lack of high performance and easy to use frameworks on the market. As a matter of fact the base framework of Structure2D has zero runtime GC allocation.

The most notable **features** are:

- Super Easy API
- 2D Collider Generation
- Cell Lighting
- Editor to easily modify Cells
- Easy Pass based Map Generator
- Lots of examples
    1. Save Manager
    2. Map Editor
    3. Map Generation loading Screen
    4. ...

1.2 Contact

If you have any **questions**, **concerns**, **feature requests** or **bug reports** feel free to contact me:

support@structure2D.com

1.3 First Steps

I recommend importing the package in to an empty project so you can dissect the demo scene.

Chapter 2

Getting Started

2.1 Some Notes on the base of the Framework

The following sections briefly describe some foundational **concepts and classes** of the Framework.

2.1.1 CellData

The CellData stores the information of the Blocks and Backgrounds.
It handles the initialization of the texture arrays that you will use inside the **Shaders**.

2.1.2 Cells

A Cell is an entity on the Map that stores the information of its current Block and Background.

2.1.3 ChunkLoader

The ChunkLoader displays the part of the **CellMap** that the Viewer can currently see.
This is the only **Component** that you have to add to a GameObject in your scene for the base framework to function.

2.1.4 Chunk

Chunks is the method used to divide the **Cells** of the **CellMap** into managable pieces.
These pieces are responsible for mapping the **Block UVs** and generating the **Colliders**.

2.1.5 TerrainShaderData

The **TerrainShaderData** is a **MonoBehavior** which handles the drawing of the **Cells**.
You don't have to add this **Component** to a GameObject. This is done on runtime for you.

2.1.6 CellMap

As the name indicates the CellMap stores the Cells.
It also provides convenient methods of fetching Cells.

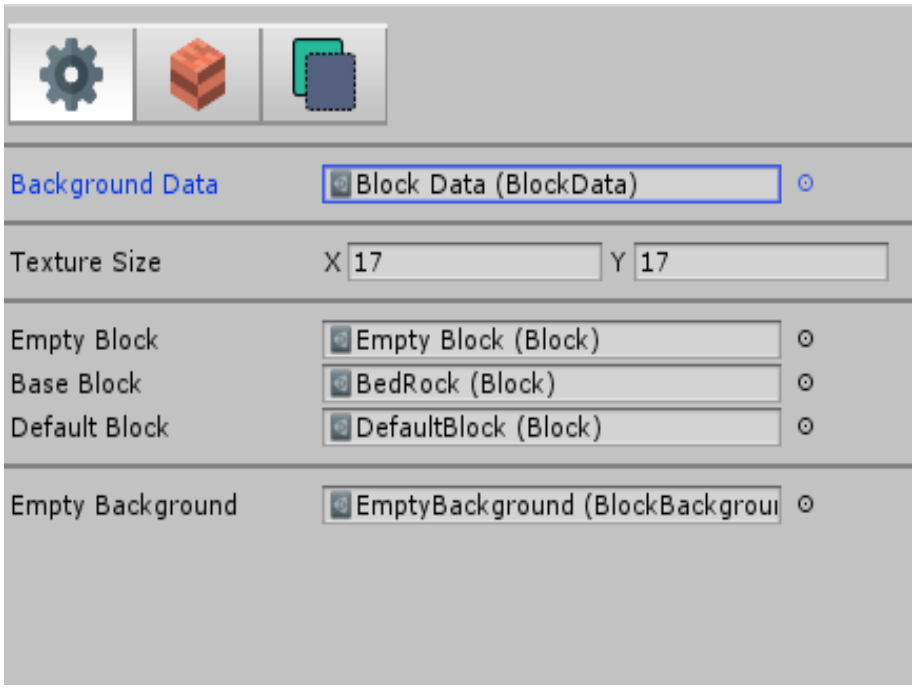
2.2 Using the Cell Editor

The Cell Editor gives you an easy interface of managing your **BlockData**, **Blocks** and **Backgrounds**.

After importing the package you can find it under: **Window->Structure2D->Editor**

2.2.1 Block Data

Setup the BlockData in the first menu.



Block Data: This field holds the Block Data that you use to edit, the one that you edit automatically becomes active one.

Texture Size: The dimensions that all textures of the **Blocks** and **Backgrounds** should have.

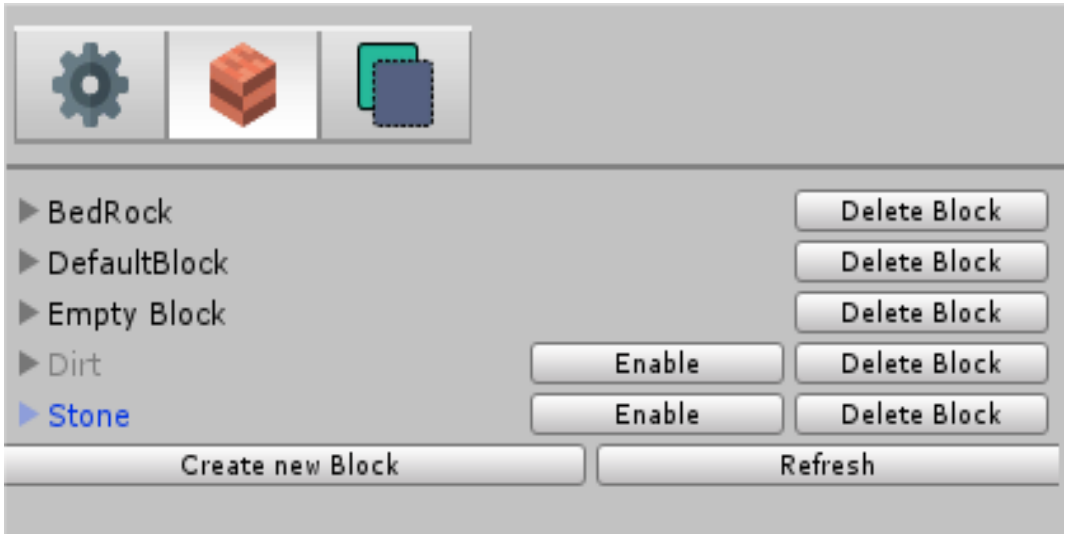
The following few Blocks and Backgrounds are necessary to the framework.

Empty Block/Background: This one is supposed to represent air.

Default Block/Background Every Cell has this one as its default Block/Background.

Base Block: The Base Block should be used as an unbreakable Block which gets placed on the bottom of the generated Map.
You probably know this one from Minecraft as Bedrock.

2.2.2 Block and Background menu

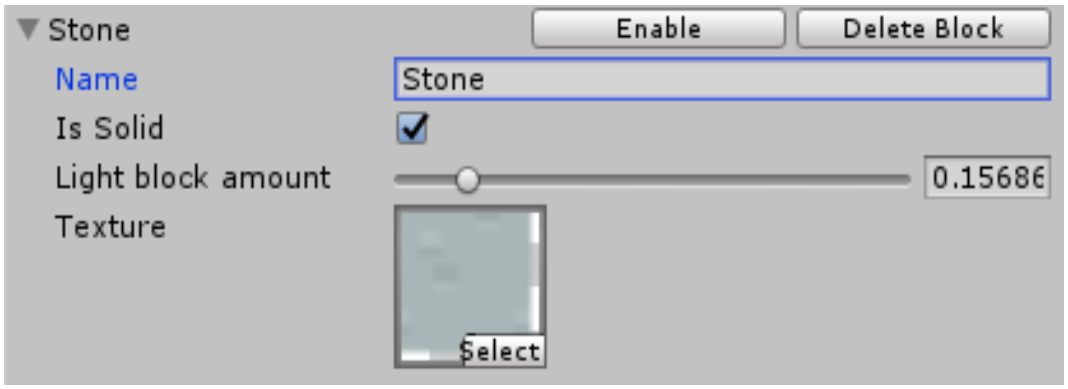


The **Block and Background Menus** are equivalent in functionality.

We can **enable**, **disable**, **create new** or **delete** entries through the editor.

Entries have in some situations other **label** colors:

- **Default:** Black
- **Error:** Red
- **Disabled:** Gray



Is Solid: Specifies whether colliders should be generated on a Cell that has this type of Block.

Light Block Amount: This is the amount of Light that gets used when light travels through this Block.

Texture This is the texture that this Block/Background should use.

Chapter 3

Lighting

Lighting in Structure2D is Cell based, this means that every cell on the map has a light value.
This light value is represented as a byte where **0** is black and **255** is lit.

3.1 Light Sources

Light sources can be added by calling AddTempLight, this has to be called every frame since the TempLights get cleared in the Late Update of the BlockLighting.

3.2 Shaders

The lighting data of the viewport is stored as a global **texture** called **_Celldata**.
Keep in mind that this is only the lighting data of the current viewport.
The **Texel Size** of the lighting data is a global **Vector4** named **_CellData_TexelSize**.
CellData.cginc demonstrates how to fetch the lighting data for the Cell of a Chunk.
Since the UVs of the Cells are not in Viewport space but in World Space we have to transform it with the global integer **_ViewerPosition**, this is the current one dimensional Cell Coordinate of the viewer.

Chapter 4

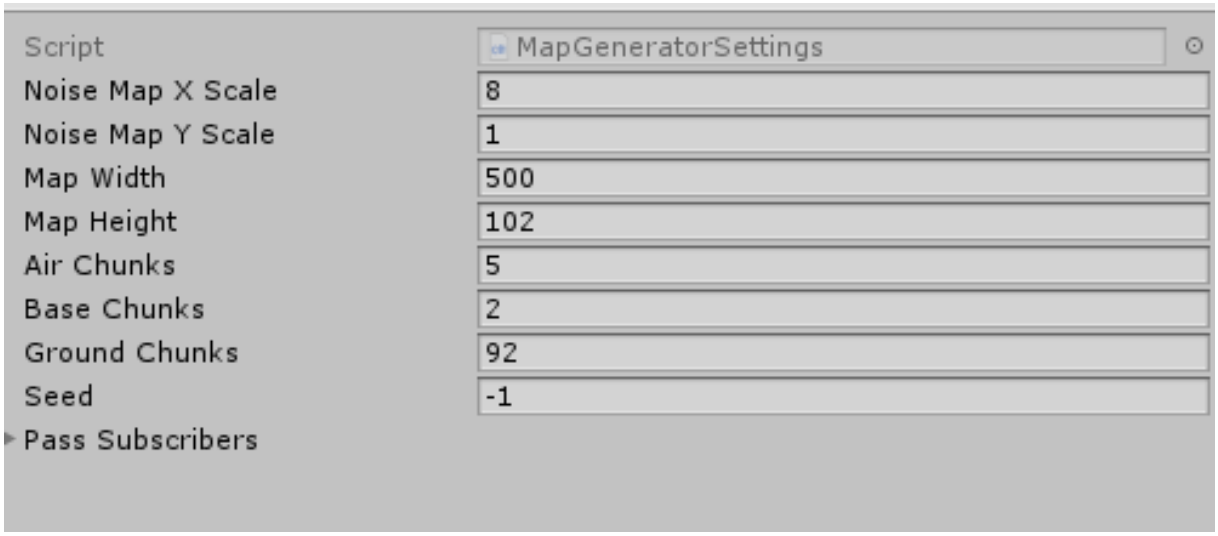
MapGenerator

The Map Generator is a **pass** based generator.
All generation specific logic is inside the passes, this means that all the generator has to know of is the passes which then generate the Map.

4.1 Creating Passes

To create a pass you have to inherit from the MapGenerationPass.
Inside the newly created class you override the Apply method to add your own logic.

4.1.1 Settings



NoiseMap Scale: This is used to scale the noise map of the base terrain pass.

Map Width: Desired width of the generated Map in Chunks.

Map Height: Desired height of the generated Map in Chunks.

Seed: This is the seed with which the MapGenRandom gets initialized, if it's -1 a random one will be generated.

Pass Subscribers: This is an array for adding Scriptable Pass Subcribers to the Map Generation.

The following is the amount of Chunks in height for the Base Generation Passes:

Base Chunks: These are Chunks that are at the ground of the Map, see Base Block for more informations.

Default Chunks: After the BaseChunks we add this amount of DefaultChunks to the Map.

Terrain Chunks: On top of the BaseChunks the TerrainChunks are added, these are generated by the active Noise map.
Note: The amount of Terrain Chunks is specified by the unused Chunks of the MapHeight.

Air Chunks: After we have generated the first base passes, we add the specified amount of empty Chunks on top.

Chapter 5

Namespace Documentation

5.1 Structure2D Namespace Reference

Classes

- class Background

  Background used by the BlockData to create texture and meta data from.
- class Block

  Class used by the BlockData to create texture and meta data from.
- class BlockSolidStateMetaData

  Meta Data which Handles the solid state of Blocks.
- class Cell

  Representation of a Block/Background inside the Map.
- class CellData

  Class which handles the creation of the Texture Arrays and Meta Data.
- class CellExtensions
- class CellMap

  This is the storage class for all the Cells. It also provides convenient methods of fetching Cells.
- class CellMetrics

  Class which holds constant data about the Cells and Chunks.
- class CellObjectLoader
- class Chunk

  Chunks handle the drawing and collider generation of Cells.
- class ChunkLoader

  The ChunkLoader handles the Loading/Unloading of Chunks based on the current Viewer Position
- class **ChunkMaterial**
- class **ColliderGenerator**
- struct Coordinate
- class LightingMetaData

  Lighting Meta Data stores information about the lighting data of Blocks and Backgrounds.
- class MetaDataBaseClass

  Base class for implementing your own Meta Data.
- class **MetaDataManager**

  This class handles the initialization of block meta data.
- class **TerrainShaderData**

  This class handles the texture which represents the block data inside our Shader. It also draws the Chunks.
- class TerrainShaderExtensions
- struct Viewport

Enumerations

- enum CoordinateAnchor {
  UpperLeft, **UpperCenter**, **UpperRight**, **MiddleLeft**,
  MiddleCenter, **MiddleRight**, **LowerLeft**, **LowerCenter**,
  LowerRight }

  Used to transform a coordinate into WorldSpace.

5.1.1 Enumeration Type Documentation

5.1.1.1 CoordinateAnchor

```
enum Structure2D.CoordinateAnchor  [strong]
```

Used to transform a coordinate into WorldSpace.

5.2 Structure2D.Base Namespace Reference

5.3 Structure2D.Base.Utility Namespace Reference

Classes

- class DebugUtility

  Used to log additional debug information.

5.4 Structure2D.Lighting Namespace Reference

Classes

- class BlockLighting

  This class handles the lighting of blocks
- class LightMap

  Used to store lighting data for all Cells of the current Map.

5.5 Structure2D.MapGeneration Namespace Reference

Classes

- struct BasePassSubscriber

  Pass subscriber which has the base passes.
- class BlockSpawnConditionChecker

  Default spawn condition checker for Blocks.
- class BlockSpawnData

  Data about how a given Block should be spawned. Used by adding a instance of this to a Block Spawner
- class BlockSpawner

  A Pass subscriber which can be used to Spawn Blocks.
- interface IGenerationPassSubscriber
- class MapGenerationPass

  Base class for the passes of the Map Generator
- class MapGenerator

  Default Map Generator.
- class MapGeneratorSettings

  This is the settings that you pass to the MapGenerator so he knows how to generate the Map.
- class MapGeneratorUi
- class NoiseMap
- class ScriptableGenerationPassSubscriber

  Subscriber which you can add to the Map Generator to run your own MapGenPasses.
- class TerrainNoise

  This is the Noise base class To add your custom Noise Map all you have to do is override the GetTerrain function and call SetCustomNoiseMap on the NoiseMap class

5.6 Structure2D.MapGeneration.BasePasses Namespace Reference

Classes

- class **AirChunkPass**

  This pass generates Air chunks which are used as a buffer on top of the generated map to let the player build upwards
- class **BaseChunkPass**

  Pass which generates Chunks of the base block type.
- class **DefaultBlockSpawnPass**

  This pass generates veins for the given Block.
- class ExamplePassSubscriber
- class **GroundChunkPass**

  This pass generates the ground chunks.
- class PlayerSpawnPass
- class SurfaceObjectSpawnPass
- class **TerrainChunkPass**

  This is the pass that uses the Noise Map to generate a terrain on top of the ground chunks
- class TreeSpawnPass

5.7 Structure2D.Utility Namespace Reference

Classes

- class **ChunkPool**
- class **ColliderPool**
- class ListPool

  Generic Pool which you can use to reuse Lists.
- struct MapData
- class SaveManager

  Utility class used to save/load the CellMap from a Stream.

Enumerations

- enum Direction {
  Up, **UpRight**, **Right**, **DownRight**,
  Down, **DownLeft**, **Left**, **UpLeft** }

  8-Directional direction enum.

5.7.1 Enumeration Type Documentation

5.7.1.1 Direction

```
enum Structure2D.Utility.Direction  [strong]
```

8-Directional direction enum.

5.8 Structure2D.Utility.MapGeneration Namespace Reference

Classes

- class PriorityQueue

  Queue used to store Map Generation Cells based on their priority.

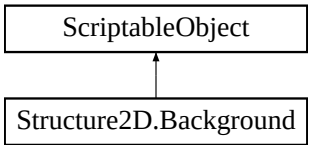
Chapter 6

Class Documentation

6.1 Structure2D.Background Class Reference

Background used by the BlockData to create texture and meta data from.

Inheritance diagram for Structure2D.Background:



Public Attributes

- byte LightBlockAmount = 20

  Amount of light this Background blocks.
- Texture2D Texture

  Texture of this Background.
- bool BlocksSunLight = true

  Does the Background block sunlight

Properties

- int ID = -1 `[get, set]`

  This is the unique Identifier for this Block. This gets set by the BlockData. If this is -1 the BlockID is not included in the BlockData.

6.1.1 Detailed Description

Background used by the BlockData to create texture and meta data from.

6.1.2 Member Data Documentation

6.1.2.1 BlocksSunLight

```
bool Structure2D.Background.BlocksSunLight = true
```

Does the Background block sunlight

6.1.2.2 LightBlockAmount

```
byte Structure2D.Background.LightBlockAmount = 20
```

Amount of light this Background blocks.

6.1.2.3 Texture

```
Texture2D Structure2D.Background.Texture
```

Texture of this Background.

6.1.3 Property Documentation

6.1.3.1 ID

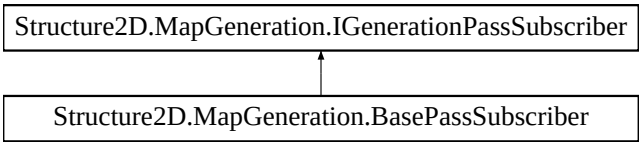
```
int Structure2D.Background.ID = -1  [get], [set]
```

This is the unique Identifier for this Block. This gets set by the BlockData. If this is -1 the BlockID is not included in the BlockData.

6.2 Structure2D.MapGeneration.BasePassSubscriber Struct Reference

Pass subscriber which has the base passes.

Inheritance diagram for Structure2D.MapGeneration.BasePassSubscriber:



Public Member Functions

- MapGenerationPass[ ] **GetPasses** ()
- int **FetchPassOrder** ()
- int **PastProgressionWeight** ()

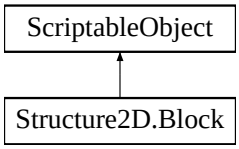
6.2.1 Detailed Description

Pass subscriber which has the base passes.

6.3 Structure2D.Block Class Reference

Class used by the BlockData to create texture and meta data from.

Inheritance diagram for Structure2D.Block:



Public Attributes

- Texture2D Texture

  Texture of the Block.
- byte LightBlockAmount = 40

  Amount of Light this Block blocks;
- bool IsSolid = true

  Should the Block be Solid.

Properties

- int ID = -1 `[get, set]`

  This is the unique Identifier for this Block. This gets set by the BlockData. If this is -1 the BlockID is not included in the BlockData.

6.3.1 Detailed Description

Class used by the BlockData to create texture and meta data from.

6.3.2 Member Data Documentation

6.3.2.1 IsSolid

```
bool Structure2D.Block.IsSolid = true
```

Should the Block be Solid.

6.3.2.2 LightBlockAmount

```
byte Structure2D.Block.LightBlockAmount = 40
```

Amount of Light this Block blocks;

6.3.2.3 Texture

```
Texture2D Structure2D.Block.Texture
```

Texture of the Block.

6.3.3 Property Documentation

6.3.3.1 ID

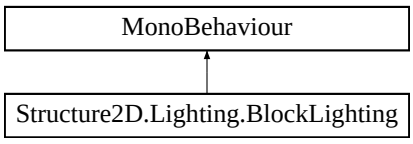
```
int Structure2D.Block.ID = -1  [get], [set]
```

This is the unique Identifier for this Block. This gets set by the BlockData. If this is -1 the BlockID is not included in the BlockData.

6.4 Structure2D.Lighting.BlockLighting Class Reference

This class handles the lighting of blocks

Inheritance diagram for Structure2D.Lighting.BlockLighting:



Static Public Member Functions

- static void AddTemporaryLight (Coordinate lightPosition, float light)

  Adds a Temporary Light at the given coordinate. Temporary Lights get cleared every LateUpdate, so it's necessary to add a new Light every Frame

Static Public Attributes

- const int MaxLightDistance = 60

  This is the max distance in blocks to which a light source can emit light.

Properties

- static byte **SkyColor** = 255 `[get, set]`

6.4.1 Detailed Description

This class handles the lighting of blocks

6.4.2 Member Function Documentation

6.4.2.1 AddTemporaryLight()

```
static void Structure2D.Lighting.BlockLighting.AddTemporaryLight (
            Coordinate lightPosition,
            float light )  [inline], [static]
```

Adds a Temporary Light at the given coordinate. Temporary Lights get cleared every LateUpdate, so it's necessary to add a new Light every Frame

Parameters

lightPosition	Coordinate at which the light should be
light	The amount of light that the coordinate should emit in a range of 0 to 1

6.4.3 Member Data Documentation

6.4.3.1 MaxLightDistance

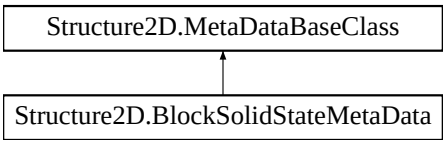
```
const int Structure2D.Lighting.BlockLighting.MaxLightDistance = 60  [static]
```

This is the max distance in blocks to which a light source can emit light.

6.5 Structure2D.BlockSolidStateMetaData Class Reference

Meta Data which Handles the solid state of Blocks.

Inheritance diagram for Structure2D.BlockSolidStateMetaData:



Public Member Functions

- override void RegisterForBlockInitialization (int size)

  This will be called before we iterate over the blocks.
- override void EnumerateBlockInitialization (Block block)

  This is called for every Block that we iterate over.

Static Public Attributes

- static bool[ ] **IsBlockSolid**

6.5.1 Detailed Description

Meta Data which Handles the solid state of Blocks.

6.5.2 Member Function Documentation

6.5.2.1 EnumerateBlockInitialization()

```
override void Structure2D.BlockSolidStateMetaData.EnumerateBlockInitialization (
            Block block )  [inline], [virtual]
```

This is called for every Block that we iterate over.

Parameters

block	The current Block.

Reimplemented from Structure2D.MetaDataBaseClass.

6.5.2.2 RegisterForBlockInitialization()

```
override void Structure2D.BlockSolidStateMetaData.RegisterForBlockInitialization (
            int size )  [inline], [virtual]
```

This will be called before we iterate over the blocks.

Parameters

size	The amount of blocks we iterate over.

Reimplemented from Structure2D.MetaDataBaseClass.

6.6 Structure2D.MapGeneration.BlockSpawnConditionChecker Class Reference

Default spawn condition checker for Blocks.

Public Member Functions

- virtual bool IsCellUsable (Cell cell, MapGenerator mapGenerator)

  Override this to create your own custom block spawn logic By default this returns false if the block is solid and doesn't to any additional checking

Public Attributes

- float **_minSpawnHeight**
- float **_maxSpawnHeight**

6.6.1 Detailed Description

Default spawn condition checker for Blocks.

6.6.2 Member Function Documentation

6.6.2.1 IsCellUsable()

```
virtual bool Structure2D.MapGeneration.BlockSpawnConditionChecker.IsCellUsable (
            Cell cell,
            MapGenerator mapGenerator )  [inline], [virtual]
```

Override this to create your own custom block spawn logic By default this returns false if the block is solid and doesn't to any additional checking

Parameters

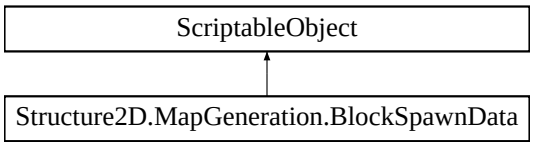
cell	

Returns

6.7 Structure2D.MapGeneration.BlockSpawnData Class Reference

Data about how a given Block should be spawned. Used by adding a instance of this to a Block Spawner

Inheritance diagram for Structure2D.MapGeneration.BlockSpawnData:



Public Attributes

- float **mapBudget**
- int **ID** => _blockToSpawn.ID
- BlockSpawnConditionChecker **BlockSpawnConditionChecker** = new BlockSpawnConditionChecker()

Properties

- int **MaxVeinSize** `[get, set]`
- int **MinVeinSize** `[get, set]`

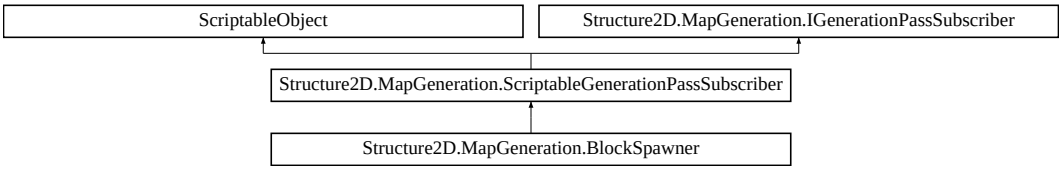
6.7.1 Detailed Description

Data about how a given Block should be spawned. Used by adding a instance of this to a Block Spawner

6.8 Structure2D.MapGeneration.BlockSpawner Class Reference

A Pass subscriber which can be used to Spawn Blocks.

Inheritance diagram for Structure2D.MapGeneration.BlockSpawner:



Public Member Functions

- override MapGenerationPass[ ] **GetPasses** ()
- override int **FetchPassOrder** ()

6.8.1 Detailed Description

A Pass subscriber which can be used to Spawn Blocks.

6.9 Structure2D.Cell Class Reference

Representation of a Block/Background inside the Map.

Public Attributes

- Coordinate Coordinate

  Coordinate of this Cell.
- Chunk Chunk

  Chunk to which this cell is mapped currently. Do not set this directly, this gets set by the Chunk.

Properties

- int Block `[get, set]`

  Block ID of this Cell.
- int Background `[get, set]`

  Background ID of this Cell.

6.9.1 Detailed Description

Representation of a Block/Background inside the Map.

6.9.2 Member Data Documentation

6.9.2.1 Chunk

```
Chunk Structure2D.Cell.Chunk
```

Chunk to which this cell is mapped currently. Do not set this directly, this gets set by the Chunk.

6.9.2.2 Coordinate

```
Coordinate Structure2D.Cell.Coordinate
```

Coordinate of this Cell.

6.9.3 Property Documentation

6.9.3.1 Background

```
int Structure2D.Cell.Background  [get], [set]
```

Background ID of this Cell.

6.9.3.2 Block

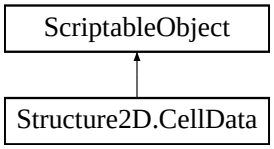
```
int Structure2D.Cell.Block  [get], [set]
```

Block ID of this Cell.

6.10 Structure2D.CellData Class Reference

Class which handles the creation of the Texture Arrays and Meta Data.

Inheritance diagram for Structure2D.CellData:



Public Member Functions

- bool **HasError** (out string errorCode)

Public Attributes

- bool **IsActive**
- Block **EmptyBlock**
- Background **EmptyBackground**
- Vector2 **TextureSize**
- Block DefaultBlock

  This is the block with which the map gets filled initially
- Background DefaultBackground

  This is the placeholder background with which the map gets filled initially
- Block BaseBlock

  This blocks is a solid unbreakable block
- Block[ ] CustomBlocks

  Here you can add your own blocks
- Background[ ] CustomBackgrounds

  Here you can add all the Background CustomBackgrounds

Properties

- Material **BlockMaterial** `[get, set]`
- static Texture2D **EmptyTexture** `[get]`
- static Vector2Int **CellDimension** `[get]`

6.10.1 Detailed Description

Class which handles the creation of the Texture Arrays and Meta Data.

6.10.2 Member Data Documentation

6.10.2.1 BaseBlock

```
Block Structure2D.CellData.BaseBlock
```

This blocks is a solid unbreakable block

6.10.2.2 CustomBackgrounds

```
Background [] Structure2D.CellData.CustomBackgrounds
```

Here you can add all the Background CustomBackgrounds

6.10.2.3 CustomBlocks

```
Block [] Structure2D.CellData.CustomBlocks
```

Here you can add your own blocks

6.10.2.4 DefaultBackground

```
Background Structure2D.CellData.DefaultBackground
```

This is the placeholder background with which the map gets filled initially

6.10.2.5 DefaultBlock

```
Block Structure2D.CellData.DefaultBlock
```

This is the block with which the map gets filled initially

6.11 Structure2D.CellExtensions Class Reference

Static Public Member Functions

- static Cell GetNeighbor (this Cell cell, Direction direction)

  Fetches the Neighbor at the given direction.

6.11.1 Member Function Documentation

6.11.1.1 GetNeighbor()

```
static Cell Structure2D.CellExtensions.GetNeighbor (
            this Cell cell,
            Direction direction )  [inline], [static]
```

Fetches the Neighbor at the given direction.

Parameters

direction	Direction from which we should fetch the Neighbor from

Returns

Returns the neighbor at the given direction, if there is none it returns null

6.12 Structure2D.CellMap Class Reference

This is the storage class for all the Cells. It also provides convenient methods of fetching Cells.

Static Public Member Functions

- static Cell GetCell (int x, int y)

  This function returns the cell at the given index. Before returning this functions checks if the given coordinate was in bounds of the CellMap. If it wasn't it returns null
- static Cell GetCell (Coordinate coordinate)

  Returns the cell at the given coordinate
- static Cell GetCellUnsafe (int x, int y)

  Returns the Cell at the given index. The difference to GetCell is that this call doesn't check if the index is in bounds of the CellMap.
- static Chunk GetChunkAtOffset (Vector2Int offset)

  Fetches the chunk at the given offset. If there is no CHunk at the offset it returns null.
- static Chunk WorldPointToChunk (Vector2 worldPoint)

  Returns the chunk at the given point in world space.
- static Vector2Int **WorldPointToChunkOffset** (Vector3 worldPoint)
- static Chunk MousePositionToChunk (Vector2 mousePosition)

  Returns the chunk at the given mouse position
- static Cell GetCellAtWorldPoint (Vector2 worldPoint)

  Returns the Cell at the given world point.
- static List< Cell > **GetCellsInBounds** (Vector2 screenPosition, int bounds)
- static Cell ScreenPositionToCell (Vector2 screenPosition)

  Fetches the Cell at the given position in Screen Space.

Static Public Attributes

- static Action MapUnloaded

  This gets called when a new Map Gets Generated.
- static Action MapInitialized

  This gets called when the Map leaves the hidden state.

Properties

- static int MapHeight `[get]`

  Current Map Height In Cells.
- static int MapWidth `[get]`

  Current Map Width in Cells.
- static bool IsMapHidden `[get]`

  This is used to pause Updating components which are dependent on the CellMap. This is useful when you want to access Cells from a separate thread, so you don't have to worry about race conditions.

6.12.1 Detailed Description

This is the storage class for all the Cells. It also provides convenient methods of fetching Cells.

6.12.2 Member Function Documentation

6.12.2.1 GetCell() [1/2]

```
static Cell Structure2D.CellMap.GetCell (
            Coordinate coordinate )  [static]
```

Returns the cell at the given coordinate

Parameters

coordinate	Coordinate of the desired Cell.

Returns

6.12.2.2 GetCell() [2/2]

```
static Cell Structure2D.CellMap.GetCell (
            int x,
            int y )  [inline], [static]
```

This function returns the cell at the given index. Before returning this functions checks if the given coordinate was in bounds of the CellMap. If it wasn't it returns null

Parameters

x	X coordinate of the desired Cell
y	Y coordinate of the desired Cell

6.12.2.3 GetCellAtWorldPoint()

```
static Cell Structure2D.CellMap.GetCellAtWorldPoint (
            Vector2 worldPoint )  [inline], [static]
```

Returns the Cell at the given world point.

Parameters

worldPoint	Point in world space.

6.12.2.4 GetCellUnsafe()

```
static Cell Structure2D.CellMap.GetCellUnsafe (
            int x,
            int y )  [inline], [static]
```

Returns the Cell at the given index. The difference to GetCell is that this call doesn't check if the index is in bounds of the CellMap.

Returns

6.12.2.5 GetChunkAtOffset()

```
static Chunk Structure2D.CellMap.GetChunkAtOffset (
            Vector2Int offset )  [inline], [static]
```

Fetches the chunk at the given offset. If there is no CHunk at the offset it returns null.

Parameters

offset	Offset of the desired Chunk.

Returns

6.12.2.6 MousePositionToChunk()

```
static Chunk Structure2D.CellMap.MousePositionToChunk (
            Vector2 mousePosition )  [inline], [static]
```

Returns the chunk at the given mouse position

Parameters

mousePosition	

Returns

6.12.2.7 ScreenPositionToCell()

```
static Cell Structure2D.CellMap.ScreenPositionToCell (
            Vector2 screenPosition )  [inline], [static]
```

Fetches the Cell at the given position in Screen Space.

Parameters

screenPosition	Position in Screen Space of the desired Cell.

6.12.2.8 WorldPointToChunk()

```
static Chunk Structure2D.CellMap.WorldPointToChunk (
            Vector2 worldPoint )  [inline], [static]
```

Returns the chunk at the given point in world space.

Parameters

worldPoint	

Returns

6.12.3 Member Data Documentation

6.12.3.1 MapInitialized

```
Action Structure2D.CellMap.MapInitialized  [static]
```

This gets called when the Map leaves the hidden state.

6.12.3.2 MapUnloaded

```
Action Structure2D.CellMap.MapUnloaded  [static]
```

This gets called when a new Map Gets Generated.

6.12.4 Property Documentation

6.12.4.1 IsMapHidden

```
bool Structure2D.CellMap.IsMapHidden  [static], [get]
```

This is used to pause Updating components which are dependent on the CellMap. This is useful when you want to access Cells from a separate thread, so you don't have to worry about race conditions.

6.12.4.2 MapHeight

```
int Structure2D.CellMap.MapHeight  [static], [get]
```

Current Map Height In Cells.

6.12.4.3 MapWidth

```
int Structure2D.CellMap.MapWidth  [static], [get]
```

Current Map Width in Cells.

6.13 Structure2D.CellMetrics Class Reference

Class which holds constant data about the Cells and Chunks.

Static Public Attributes

- const float CellSize = 0.25f

  The size that every Cell should be big.
- const int ChunkSize = 10

  The amount of Cells that a chunk can store in each dimensions.

6.13.1 Detailed Description

Class which holds constant data about the Cells and Chunks.

6.13.2 Member Data Documentation

6.13.2.1 CellSize

```
const float Structure2D.CellMetrics.CellSize = 0.25f  [static]
```

The size that every Cell should be big.

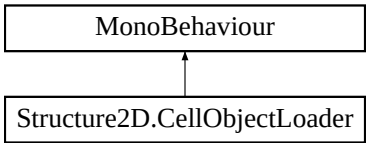
6.13.2.2 ChunkSize

```
const int Structure2D.CellMetrics.ChunkSize = 10  [static]
```

The amount of Cells that a chunk can store in each dimensions.

6.14 Structure2D.CellObjectLoader Class Reference

Inheritance diagram for Structure2D.CellObjectLoader:



Public Member Functions

- void **SetMappedPosition** (Vector2Int newPosition)

6.15 Structure2D.Chunk Class Reference

Chunks handle the drawing and collider generation of Cells.

Public Member Functions

- void GenerateColliders ()

  Generates colliders for this Chunk.

Properties

- bool IsVisible `[get, set]`

  Is the Chunk currently Visible.
- Vector2Int Offset `[get, set]`

  Offset of this Chunk.
- Vector2Int CellOffset `[get]`

  Offset of this Chunk in Cells.

6.15.1 Detailed Description

Chunks handle the drawing and collider generation of Cells.

6.15.2 Member Function Documentation

6.15.2.1 GenerateColliders()

```
void Structure2D.Chunk.GenerateColliders ( )  [inline]
```

Generates colliders for this Chunk.

6.15.3 Property Documentation

6.15.3.1 CellOffset

```
Vector2Int Structure2D.Chunk.CellOffset  [get]
```

Offset of this Chunk in Cells.

6.15.3.2 IsVisible

```
bool Structure2D.Chunk.IsVisible  [get], [set]
```

Is the Chunk currently Visible.

6.15.3.3 Offset

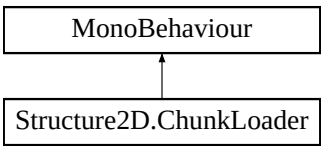
```
Vector2Int Structure2D.Chunk.Offset  [get], [set]
```

Offset of this Chunk.

6.16 Structure2D.ChunkLoader Class Reference

The ChunkLoader handles the Loading/Unloading of Chunks based on the current Viewer Position

Inheritance diagram for Structure2D.ChunkLoader:



Public Member Functions

- void **Update** ()

Public Attributes

- GameObject Viewer

  Viewer on which position we base the viewport on

Static Public Attributes

- static Action< Vector2Int > ChunkLoaded

  This gets called when a chunk gets loaded, with the chunk offset of the unloaded chunk.
- static Action< Vector2Int > ChunkUnloaded

  This gets called when a chunk gets unloaded, with the chunk offset of the unloaded chunk.

Properties

- static ChunkLoader **SingleTon** `[get]`
- static int DesiredViewPortSizeX `[get]`

  Width of the Viewport in Chunks.
- static int DesiredViewPortSizeY `[get]`

  Height of the Viewport in Chunks.

6.16.1 Detailed Description

The ChunkLoader handles the Loading/Unloading of Chunks based on the current Viewer Position

6.16.2 Member Data Documentation

6.16.2.1 ChunkLoaded

```
Action<Vector2Int> Structure2D.ChunkLoader.ChunkLoaded  [static]
```

This gets called when a chunk gets loaded, with the chunk offset of the unloaded chunk.

6.16.2.2 ChunkUnloaded

```
Action<Vector2Int> Structure2D.ChunkLoader.ChunkUnloaded  [static]
```

This gets called when a chunk gets unloaded, with the chunk offset of the unloaded chunk.

6.16.2.3 Viewer

```
GameObject Structure2D.ChunkLoader.Viewer
```

Viewer on which position we base the viewport on

6.16.3 Property Documentation

6.16.3.1 DesiredViewPortSizeX

```
int Structure2D.ChunkLoader.DesiredViewPortSizeX  [static], [get]
```

Width of the Viewport in Chunks.

6.16.3.2 DesiredViewPortSizeY

```
int Structure2D.ChunkLoader.DesiredViewPortSizeY  [static], [get]
```

Height of the Viewport in Chunks.

6.17 Structure2D.Coordinate Struct Reference

Public Member Functions

- **Coordinate** (int x, int y)
- int DistanceTo (Coordinate other)

  Returns the distance from this coordinate to the given one
- int GetIndex ()

  Returns the index of this coordinate as it's 1D representation
- override string **ToString** ()

Static Public Member Functions

- static Vector3 **ToWorldPoint** (Coordinate coordinate)
- static Vector3 **ToWorldPoint** (Coordinate coordinate, CoordinateAnchor anchor)
- static Coordinate FromScreenPoint (Vector2 screenPoint)

  Creates a coordinate from the given ScreenPoint
- static Coordinate **FromWorldPoint** (Vector2 worldPoint)
- static int ToIndex (int x, int y)

  This converts the given 2D index to a 1D index
- static Coordinate **operator+** (Coordinate a, Coordinate b)
- static Coordinate **operator-** (Coordinate a, Coordinate b)
- static bool **operator==** (Coordinate a, Coordinate b)
- static bool **operator!=** (Coordinate a, Coordinate b)
- static Coordinate **operator*** (Coordinate a, Coordinate b)
- static Coordinate **operator*** (Coordinate a, int b)
- static implicit **operator Coordinate** (Vector2Int vectorToTransform)

Public Attributes

- int **x**
- int **y**

Static Public Attributes

- static Coordinate **Up** => new Coordinate(0, 1)
- static Coordinate **Down** => new Coordinate(0, -1)
- static Coordinate **Left** => new Coordinate(-1, 0)
- static Coordinate **Right** => new Coordinate(1, 0)
- static Coordinate **One** => new Coordinate(1, 1)

6.17.1 Member Function Documentation

6.17.1.1 DistanceTo()

```
int Structure2D.Coordinate.DistanceTo (
            Coordinate other )  [inline]
```

Returns the distance from this coordinate to the given one

Parameters

other	

Returns

6.17.1.2 FromScreenPoint()

```
static Coordinate Structure2D.Coordinate.FromScreenPoint (
            Vector2 screenPoint )  [inline], [static]
```

Creates a coordinate from the given ScreenPoint

Parameters

screenPoint	

Returns

6.17.1.3 GetIndex()

```
int Structure2D.Coordinate.GetIndex ( )  [inline]
```

Returns the index of this coordinate as it's 1D representation

Returns

6.17.1.4 ToIndex()

```
static int Structure2D.Coordinate.ToIndex (
            int x,
            int y )  [inline], [static]
```

This converts the given 2D index to a 1D index

Parameters

x	
y	

Returns

6.18 Structure2D.Base.Utility.DebugUtility Class Reference

Used to log additional debug information.

Public Member Functions

- delegate void **DebugTarget** (string stringToLog)

Static Public Member Functions

- static void SetDebugTarget (DebugTarget target)

  Sets the target to which the Debug Utility should print.

Properties

- static bool DoDebug = true `[get]`

  If this is set to true some classes will print additional information to the debug target.

6.18.1 Detailed Description

Used to log additional debug information.

6.18.2 Member Function Documentation

6.18.2.1 SetDebugTarget()

```
static void Structure2D.Base.Utility.DebugUtility.SetDebugTarget (
            DebugTarget target )  [inline], [static]
```

Sets the target to which the Debug Utility should print.

Parameters

target	

6.18.3 Property Documentation

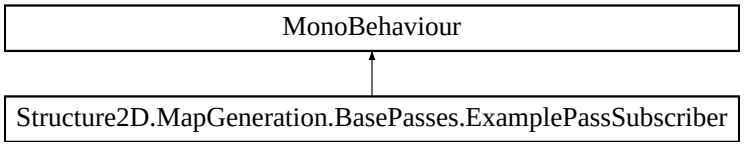
6.18.3.1 DoDebug

```
bool Structure2D.Base.Utility.DebugUtility.DoDebug = true  [static], [get]
```

If this is set to true some classes will print additional information to the debug target.

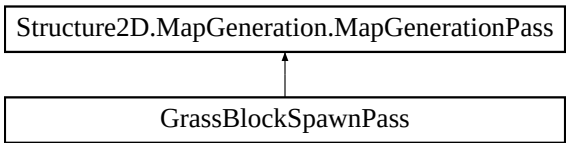
6.19 Structure2D.MapGeneration.BasePasses.ExamplePassSubscriber Class Reference

Inheritance diagram for Structure2D.MapGeneration.BasePasses.ExamplePassSubscriber:



6.20 GrassBlockSpawnPass Class Reference

Inheritance diagram for GrassBlockSpawnPass:



Public Member Functions

- override void Apply (MapGenerator mapGenerator)

  Override this to add your Pass logic.

6.20.1 Member Function Documentation

6.20.1.1 Apply()

```
override void GrassBlockSpawnPass.Apply (
            MapGenerator mapGenerator )  [inline], [virtual]
```

Override this to add your Pass logic.

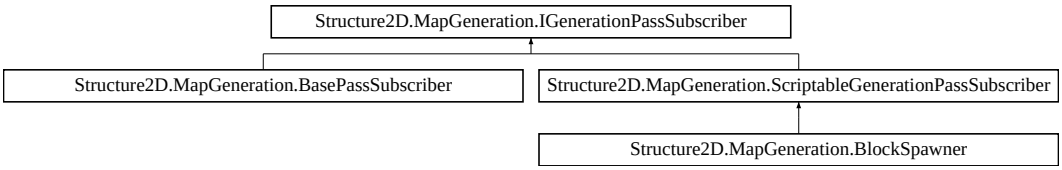
Parameters

mapGenerator	This is the generator that calls the pass.

Reimplemented from Structure2D.MapGeneration.MapGenerationPass.

6.21 Structure2D.MapGeneration.IGenerationPassSubscriber Interface Reference

Inheritance diagram for Structure2D.MapGeneration.IGenerationPassSubscriber:



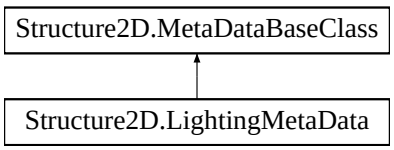
Public Member Functions

- MapGenerationPass[ ] **GetPasses** ()
- int **FetchPassOrder** ()

6.22 Structure2D.LightingMetaData Class Reference

Lighting Meta Data stores information about the lighting data of Blocks and Backgrounds.

Inheritance diagram for Structure2D.LightingMetaData:



Public Member Functions

- override void RegisterForBlockInitialization (int size)

  This will be called before we iterate over the blocks.
- override void EnumerateBlockInitialization (Block block)

  This is called for every Block that we iterate over.
- override void RegisterForBackgroundInitialization (int size)

  This is called for every background we iterate over.
- override void EnumerateBackgroundInitialization (Background background)

  This is called for every Background we iterate over.

Static Public Attributes

- static byte[ ] **BackgroundsLightBlockAmount**
- static byte[ ] **BlocksLightBlockAmount**
- static bool[ ] **DoesBackgroundTypeBlockSunlight**

6.22.1 Detailed Description

Lighting Meta Data stores information about the lighting data of Blocks and Backgrounds.

6.22.2 Member Function Documentation

6.22.2.1 EnumerateBackgroundInitialization()

```
override void Structure2D.LightingMetaData.EnumerateBackgroundInitialization (
            Background background )  [inline], [virtual]
```

This is called for every Background we iterate over.

Parameters

background	The current Background.

Reimplemented from Structure2D.MetaDataBaseClass.

6.22.2.2 EnumerateBlockInitialization()

```
override void Structure2D.LightingMetaData.EnumerateBlockInitialization (
            Block block )  [inline], [virtual]
```

This is called for every Block that we iterate over.

Parameters

block	The current Block.

Reimplemented from Structure2D.MetaDataBaseClass.

6.22.2.3 RegisterForBackgroundInitialization()

```
override void Structure2D.LightingMetaData.RegisterForBackgroundInitialization (
            int size )  [inline], [virtual]
```

This is called for every background we iterate over.

Parameters

size	Amount of background that we iterate over.

Reimplemented from Structure2D.MetaDataBaseClass.

6.22.2.4 RegisterForBlockInitialization()

```
override void Structure2D.LightingMetaData.RegisterForBlockInitialization (
            int size )  [inline], [virtual]
```

This will be called before we iterate over the blocks.

Parameters

size	The amount of blocks we iterate over.

Reimplemented from Structure2D.MetaDataBaseClass.

6.23 Structure2D.Lighting.LightMap Class Reference

Used to store lighting data for all Cells of the current Map.

Static Public Member Functions

- static void **SetLightMap** (Color32[ ] threadLightValues)
- static NativeArray< Color32 > **GetLightMap** ()
- static void **Clear** ()

6.23.1 Detailed Description

Used to store lighting data for all Cells of the current Map.

6.24 Structure2D.Utility.ListPool< T > Class Template Reference

Generic Pool which you can use to reuse Lists.

Static Public Member Functions

- static List< T > Get ()

  Returns a list of the pool. If there is none one will be created.
- static void Add (List< T > list)

  Push a list back into the pool. The list will be cleared before being added.

6.24.1 Detailed Description

Generic Pool which you can use to reuse Lists.

Template Parameters

T	

6.24.2 Member Function Documentation

6.24.2.1 Add()

```
static void Structure2D.Utility.ListPool< T >.Add (
            List< T > list )  [inline], [static]
```

Push a list back into the pool. The list will be cleared before being added.

6.24.2.2 Get()

```
static List<T> Structure2D.Utility.ListPool< T >.Get ( )  [inline], [static]
```

Returns a list of the pool. If there is none one will be created.

Returns

6.25 Structure2D.Utility.MapData Struct Reference

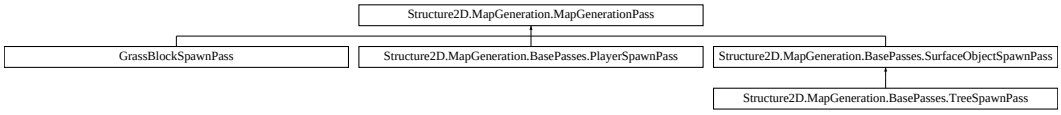
Public Attributes

- int **MapWidth**
- int **MapHeight**
- double **MapVersion**

6.26 Structure2D.MapGeneration.MapGenerationPass Class Reference

Base class for the passes of the Map Generator

Inheritance diagram for Structure2D.MapGeneration.MapGenerationPass:



Public Member Functions

- virtual void Apply (MapGenerator mapGenerator)

  Override this to add your Pass logic.
- virtual void PrepareGeneration ()

  This is called before the generation gets started on the separate thread, you can use this to prepare things that are only possible on the main thread.
- virtual int GetWeight ()

  This weight is used the calculate the current Map Generation progress.

6.26.1 Detailed Description

Base class for the passes of the Map Generator

6.26.2 Member Function Documentation

6.26.2.1 Apply()

```
virtual void Structure2D.MapGeneration.MapGenerationPass.Apply (
            MapGenerator mapGenerator )  [inline], [virtual]
```

Override this to add your Pass logic.

Parameters

mapGenerator	This is the generator that calls the pass.

Reimplemented in Structure2D.MapGeneration.BasePasses.SurfaceObjectSpawnPass, Structure2D.MapGeneration.BasePasses.Pla and GrassBlockSpawnPass.

6.26.2.2 GetWeight()

```
virtual int Structure2D.MapGeneration.MapGenerationPass.GetWeight ( )  [inline], [virtual]
```

This weight is used the calculate the current Map Generation progress.

Reimplemented in Structure2D.MapGeneration.BasePasses.PlayerSpawnPass.

6.26.2.3 PrepareGeneration()

```
virtual void Structure2D.MapGeneration.MapGenerationPass.PrepareGeneration ( )  [inline],
[virtual]
```

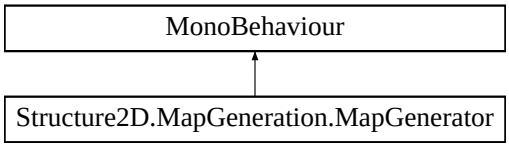
This is called before the generation gets started on the separate thread, you can use this to prepare things that are only possible on the main thread.

Reimplemented in Structure2D.MapGeneration.BasePasses.SurfaceObjectSpawnPass, Structure2D.MapGeneration.BasePasses.Tre and Structure2D.MapGeneration.BasePasses.PlayerSpawnPass.

6.27 Structure2D.MapGeneration.MapGenerator Class Reference

Default Map Generator.

Inheritance diagram for Structure2D.MapGeneration.MapGenerator:



Classes

- class ObjectSpawnQueueData

  Used to queue the spawning of objects while in a multi-threaded environment.

Public Member Functions

- void GenerateMap ()

  Generates a map with the default settings.
- void GenerateMap (MapGeneratorSettings settings)

  Generates a map with the given settings.
- Cell GetRandomSolidCell ()

  Searches for a solid cell starting from a random starting cell
- bool IsBlockInDesiredHeight (int cellHeight, float minSpawnHeight, float maxSpawnHeight)

  Returns whether the given block height is higher than the min spawn height and lower than the max spawn height
- void **AddPass** (MapGenerationPass pass, int priority)
- int? **GetSurfaceCellHeight** (int column)
- ObjectSpawnQueueData SpawnGameObject (GameObject objectToSpawn)

  Use this to spawn GameObjects from passes, this add the given objects to a queue where it gets spawned as soon as the Map Generation finished.
- ObjectSpawnQueueData **SpawnGameObject** (GameObject objectToSpawn, ObjectSpawnQueueData parent)
- ObjectSpawnQueueData **SpawnGameObject** (GameObject objectToSpawn, Vector3 position, Quaternion rotation, ObjectSpawnQueueData parent)

Static Public Attributes

- static Action StartedMapGeneration

  This is called when the Map Generator starts generating the Map.
- static Action FinishedMapGeneration

  This is called when the Map Generation has finished.
- static Action< MapGenerator > PreparePasses

  You can use this to add your passes without an IPassGenerationSubscriber. Just call AddPass on the given MapGenerator.

Properties

- MapGeneratorSettings **ActiveMapGenSettings** `[get]`
- int BaseChunkCellHeight `[get]`

  Height in Cells which the Base pass uses.
- int AirChunkCellHeight `[get]`

  Height in cells which the Air pass uses.
- int GroundCellHeight `[get]`

  Height in Cells which the Ground pass uses.
- int GroundCellStart `[get]`

  Height in Cells at which the Ground pass starts.
- int TerrainCellHeight `[get]`

  Height in Cells which the Terrain pass uses.
- System.Random MapGenRandom `[get]`

  If you need randoms inside a MapGenerationPass you can use this variable. Unity's' Random class doesn't work on any other thread than the main one.
- int UsableDefaultBlocks `[get, set]`

  Amount of Blocks that are the default Block. This is used by the Default Block Pass to check if there are enough blocks leftover to spawn.
- int **ActiveSeed** `[get]`
- int MapWidth `[get]`

  Map Width in Cells.
- int MapHeight `[get]`

  Map Height in Cells.
- static long GenerationProgress `[get, set]`

  Generation Progress in a range of 0..100

6.27.1 Detailed Description

Default Map Generator.

6.27.2 Member Function Documentation

6.27.2.1 GenerateMap() [1/2]

```
void Structure2D.MapGeneration.MapGenerator.GenerateMap ( )  [inline]
```

Generates a map with the default settings.

6.27.2.2 GenerateMap() [2/2]

```
void Structure2D.MapGeneration.MapGenerator.GenerateMap (
            MapGeneratorSettings settings )  [inline]
```

Generates a map with the given settings.

Parameters

settings	Settings that the Map Generator should use.

6.27.2.3 GetRandomSolidCell()

```
Cell Structure2D.MapGeneration.MapGenerator.GetRandomSolidCell ( )  [inline]
```

Searches for a solid cell starting from a random starting cell

6.27.2.4 IsBlockInDesiredHeight()

```
bool Structure2D.MapGeneration.MapGenerator.IsBlockInDesiredHeight (
            int cellHeight,
            float minSpawnHeight,
            float maxSpawnHeight )  [inline]
```

Returns whether the given block height is higher than the min spawn height and lower than the max spawn height

Parameters

minSpawnHeight	This is the lowest height in percent where the block will be counted as valid
maxSpawnHeight	This is the maximum height in percent where the block will be counted as valid

6.27.2.5 SpawnGameObject()

```
ObjectSpawnQueueData Structure2D.MapGeneration.MapGenerator.SpawnGameObject (
```

```
GameObject objectToSpawn )  [inline]
```

Use this to spawn GameObjects from passes, this add the given objects to a queue where it gets spawned as soon as the Map Generation finished.

Parameters

objectToSpawn	

6.27.3 Member Data Documentation

6.27.3.1 FinishedMapGeneration

```
Action Structure2D.MapGeneration.MapGenerator.FinishedMapGeneration  [static]
```

This is called when the Map Generation has finished.

6.27.3.2 PreparePasses

```
Action<MapGenerator> Structure2D.MapGeneration.MapGenerator.PreparePasses  [static]
```

You can use this to add your passes without an IPassGenerationSubscriber. Just call AddPass on the given MapGenerator.

6.27.3.3 StartedMapGeneration

```
Action Structure2D.MapGeneration.MapGenerator.StartedMapGeneration  [static]
```

This is called when the Map Generator starts generating the Map.

6.27.4 Property Documentation

6.27.4.1 AirChunkCellHeight

```
int Structure2D.MapGeneration.MapGenerator.AirChunkCellHeight  [get]
```

Height in cells which the Air pass uses.

6.27.4.2 BaseChunkCellHeight

```
int Structure2D.MapGeneration.MapGenerator.BaseChunkCellHeight [get]
```

Height in Cells which the Base pass uses.

6.27.4.3 GenerationProgress

```
long Structure2D.MapGeneration.MapGenerator.GenerationProgress [static], [get], [set]
```

Generation Progress in a range of 0..100

6.27.4.4 GroundCellHeight

```
int Structure2D.MapGeneration.MapGenerator.GroundCellHeight [get]
```

Height in Cells which the Ground pass uses.

6.27.4.5 GroundCellStart

```
int Structure2D.MapGeneration.MapGenerator.GroundCellStart [get]
```

Height in Cells at which the Ground pass starts.

6.27.4.6 MapGenRandom

```
System.Random Structure2D.MapGeneration.MapGenerator.MapGenRandom [get]
```

If you need randoms inside a MapGenerationPass you can use this variable. Unity's' Random class doesn't work on any other thread than the main one.

6.27.4.7 MapHeight

```
int Structure2D.MapGeneration.MapGenerator.MapHeight [get]
```

Map Height in Cells.

6.27.4.8 MapWidth

```
int Structure2D.MapGeneration.MapGenerator.MapWidth  [get]
```

Map Width in Cells.

6.27.4.9 TerrainCellHeight

```
int Structure2D.MapGeneration.MapGenerator.TerrainCellHeight  [get]
```

Height in Cells which the Terrain pass uses.

6.27.4.10 UsableDefaultBlocks

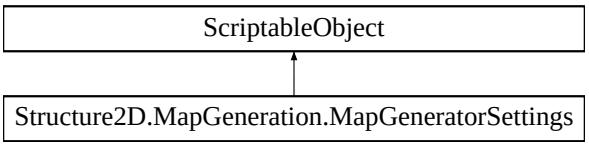
```
int Structure2D.MapGeneration.MapGenerator.UsableDefaultBlocks  [get], [set]
```

Amount of Blocks that are the default Block. This is used by the Default Block Pass to check if there are enough blocks leftover to spawn.

6.28 Structure2D.MapGeneration.MapGeneratorSettings Class Reference

This is the settings that you pass to the MapGenerator so he knows how to generate the Map.

Inheritance diagram for Structure2D.MapGeneration.MapGeneratorSettings:



Public Member Functions

- void **OnValidate** ()

Public Attributes

- float NoiseMapXScale

  Used to scale the Noise Map for the terrain chunks
- float **NoiseMapYScale**
- int MapWidth

  This is the
- int **MapHeight**
- int **AirChunks**
- int **BaseChunks**
- int **GroundChunks**
- int Seed

  If this is -1 a random Seed will be used
- ScriptableGenerationPassSubscriber[ ] PassSubscribers

  You can add custom passes that should be executed when generating the map in this field.

6.28.1 Detailed Description

This is the settings that you pass to the MapGenerator so he knows how to generate the Map.

6.28.2 Member Data Documentation

6.28.2.1 MapWidth

```
int Structure2D.MapGeneration.MapGeneratorSettings.MapWidth
```

This is the

6.28.2.2 NoiseMapXScale

```
float Structure2D.MapGeneration.MapGeneratorSettings.NoiseMapXScale
```

Used to scale the Noise Map for the terrain chunks

6.28.2.3 PassSubscribers

```
ScriptableGenerationPassSubscriber [] Structure2D.MapGeneration.MapGeneratorSettings.Pass↩
Subscribers
```

You can add custom passes that should be executed when generating the map in this field.

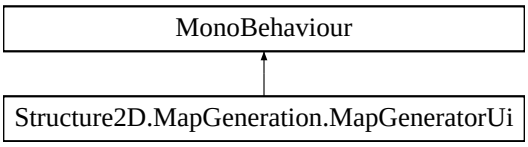
6.28.2.4 Seed

```
int Structure2D.MapGeneration.MapGeneratorSettings.Seed
```

If this is -1 a random Seed will be used

6.29 Structure2D.MapGeneration.MapGeneratorUi Class Reference

Inheritance diagram for Structure2D.MapGeneration.MapGeneratorUi:



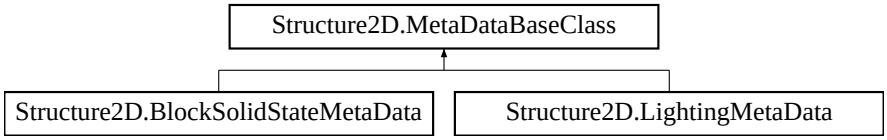
Public Member Functions

- void **LoadMap** ()

6.30 Structure2D.MetaDataBaseClass Class Reference

Base class for implementing your own Meta Data.

Inheritance diagram for Structure2D.MetaDataBaseClass:



Public Member Functions

- virtual void RegisterForBlockInitialization (int size)

  This will be called before we iterate over the blocks.
- virtual void EnumerateBlockInitialization (Block block)

  This is called for every Block that we iterate over.
- virtual void RegisterForBackgroundInitialization (int size)

  This is called for every background we iterate over.
- virtual void EnumerateBackgroundInitialization (Background background)

  This is called for every Background we iterate over.

6.30.1 Detailed Description

Base class for implementing your own Meta Data.

6.30.2 Member Function Documentation

6.30.2.1 EnumerateBackgroundInitialization()

```
virtual void Structure2D.MetaDataBaseClass.EnumerateBackgroundInitialization (
            Background background )  [inline], [virtual]
```

This is called for every Background we iterate over.

Parameters

background	The current Background.

Reimplemented in Structure2D.LightingMetaData.

6.30.2.2 EnumerateBlockInitialization()

```
virtual void Structure2D.MetaDataBaseClass.EnumerateBlockInitialization (
            Block block )  [inline], [virtual]
```

This is called for every Block that we iterate over.

Parameters

block	The current Block.

Reimplemented in Structure2D.LightingMetaData, and Structure2D.BlockSolidStateMetaData.

6.30.2.3 RegisterForBackgroundInitialization()

```
virtual void Structure2D.MetaDataBaseClass.RegisterForBackgroundInitialization (
            int size )  [inline], [virtual]
```

This is called for every background we iterate over.

Parameters

size	Amount of background that we iterate over.

Reimplemented in Structure2D.LightingMetaData.

6.30.2.4 RegisterForBlockInitialization()

```
virtual void Structure2D.MetaDataBaseClass.RegisterForBlockInitialization (
            int size )  [inline], [virtual]
```

This will be called before we iterate over the blocks.

Parameters

size	The amount of blocks we iterate over.

Reimplemented in Structure2D.LightingMetaData, and Structure2D.BlockSolidStateMetaData.

6.31 Structure2D.MapGeneration.NoiseMap Class Reference

Static Public Member Functions

- static void SetCustomNoiseMap (TerrainNoise noise)

  Use this to use your custom noise map instead of the default one.
- static IEnumerable< float > **GetTerrain** (int width, int height, int seed)
- static void **SetScale** (float settingsNoiseMapXScale, float settingsNoiseMapYScale)

6.31.1 Member Function Documentation

6.31.1.1 SetCustomNoiseMap()

```
static void Structure2D.MapGeneration.NoiseMap.SetCustomNoiseMap (
            TerrainNoise noise )  [inline], [static]
```

Use this to use your custom noise map instead of the default one.

Parameters

noise	

6.32 Structure2D.MapGeneration.BasePasses.SurfaceObjectSpawn↩ Pass.ObjectSpawnData Struct Reference

Public Attributes

- float **SpawnHeight**
- GameObject **ObjectToSpawn**

6.33 Structure2D.MapGeneration.MapGenerator.ObjectSpawnQueueData Class Reference

Used to queue the spawning of objects while in a multi-threaded environment.

Public Attributes

- GameObject ObjectToSpawn

  Object to Spawn.
- string **Name**
- ObjectSpawnQueueData Parent

  Parent to spawn to.
- Vector3 Position

  Desired Spawn Position.
- Quaternion Rotation

  Desired Spawn Rotation.
- Type[ ] Types

  These components get added when null is passed as the ObjectToSpawn.

Properties

- Transform SpawnedObject `[get]`

  This will be resolved as soon as the object is spawned.

6.33.1 Detailed Description

Used to queue the spawning of objects while in a multi-threaded environment.

6.33.2 Member Data Documentation

6.33.2.1 ObjectToSpawn

```
GameObject Structure2D.MapGeneration.MapGenerator.ObjectSpawnQueueData.ObjectToSpawn
```

Object to Spawn.

6.33.2.2 Parent

```
ObjectSpawnQueueData Structure2D.MapGeneration.MapGenerator.ObjectSpawnQueueData.Parent
```

Parent to spawn to.

6.33.2.3 Position

```
Vector3 Structure2D.MapGeneration.MapGenerator.ObjectSpawnQueueData.Position
```

Desired Spawn Position.

6.33.2.4 Rotation

```
Quaternion Structure2D.MapGeneration.MapGenerator.ObjectSpawnQueueData.Rotation
```

Desired Spawn Rotation.

6.33.2.5 Types

```
Type [] Structure2D.MapGeneration.MapGenerator.ObjectSpawnQueueData.Types
```

These components get added when null is passed as the ObjectToSpawn.

6.33.3 Property Documentation

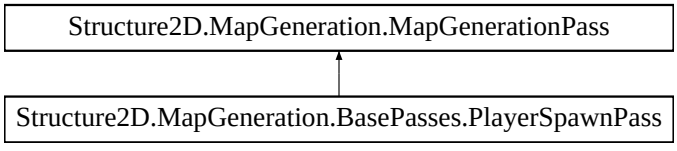
6.33.3.1 SpawnedObject

```
Transform Structure2D.MapGeneration.MapGenerator.ObjectSpawnQueueData.SpawnedObject  [get]
```

This will be resolved as soon as the object is spawned.

6.34 Structure2D.MapGeneration.BasePasses.PlayerSpawnPass Class Reference

Inheritance diagram for Structure2D.MapGeneration.BasePasses.PlayerSpawnPass:



Public Member Functions

- override void PrepareGeneration ()

  This is called before the generation gets started on the separate thread, you can use this to prepare things that are only possible on the main thread.
- override void Apply (MapGenerator mapGenerator)

  Override this to add your Pass logic.
- override int GetWeight ()

  This weight is used the calculate the current Map Generation progress.

6.34.1 Member Function Documentation

6.34.1.1 Apply()

```
override void Structure2D.MapGeneration.BasePasses.PlayerSpawnPass.Apply (
            MapGenerator mapGenerator )  [inline], [virtual]
```

Override this to add your Pass logic.

Parameters

mapGenerator	This is the generator that calls the pass.

Reimplemented from Structure2D.MapGeneration.MapGenerationPass.

6.34.1.2 GetWeight()

```
override int Structure2D.MapGeneration.BasePasses.PlayerSpawnPass.GetWeight ( )  [inline],
[virtual]
```

This weight is used the calculate the current Map Generation progress.

Reimplemented from Structure2D.MapGeneration.MapGenerationPass.

6.34.1.3 PrepareGeneration()

```
override void Structure2D.MapGeneration.BasePasses.PlayerSpawnPass.PrepareGeneration ( )  [inline],
[virtual]
```

This is called before the generation gets started on the separate thread, you can use this to prepare things that are only possible on the main thread.

Reimplemented from Structure2D.MapGeneration.MapGenerationPass.

6.35 Structure2D.Utility.MapGeneration.PriorityQueue Class Reference

Queue used to store Map Generation Cells based on their priority.

Classes

- struct QueueData

Public Member Functions

- bool **IsCellQueueAble** (Cell cell)
- void Enqueue (QueueData data)

  Enqueues the cell by it's priority.
- Cell Dequeue (MapGenerator generator)

  Fetches the Cell with the highest priority.
- void Clear ()

  Clears the queue.

Public Attributes

- int Count => count

  Amount of Cells currently inside the queue.

6.35.1 Detailed Description

Queue used to store Map Generation Cells based on their priority.

6.35.2 Member Function Documentation

6.35.2.1 Clear()

```
void Structure2D.Utility.MapGeneration.PriorityQueue.Clear ( )  [inline]
```

Clears the queue.

6.35.2.2 Dequeue()

```
Cell Structure2D.Utility.MapGeneration.PriorityQueue.Dequeue (
            MapGenerator generator )  [inline]
```

Fetches the Cell with the highest priority.

Returns

6.35.2.3 Enqueue()

```
void Structure2D.Utility.MapGeneration.PriorityQueue.Enqueue (
            QueueData data )  [inline]
```

Enqueues the cell by it's priority.

6.35.3 Member Data Documentation

6.35.3.1 Count

```
int Structure2D.Utility.MapGeneration.PriorityQueue.Count => count
```

Amount of Cells currently inside the queue.

6.36 Structure2D.Utility.MapGeneration.PriorityQueue.QueueData Struct Reference

Public Attributes

- Cell **Cell**
- int **Distance**
- int **SearchHeuristic**

6.37 Structure2D.Utility.SaveManager Class Reference

Utility class used to save/load the CellMap from a Stream.

Static Public Member Functions

- static void SaveMapToStream (Stream stream)

  Saves the currently active Map to the given stream
- static bool LoadMapFromStream (Stream stream, bool allowCrossVersionLoading=false)

  Initializes the CellMap with the Map from the given stream
- static bool **CanLoadMap** (Stream stream, out MapData mapData, bool allowCrossVersionLoading=false)

Static Public Attributes

- const double **ProjectVersion** = 1.0
- static Action< BinaryWriter, Coordinate > OnSavedCell

  This will be called for every Cell that gets serialized You can use the given writer to write your own data to the stream.
- static Action< BinaryReader, Coordinate > OnLoadedCell

  If you use OnSavedCell to save your own custom data use this to read it back when the cells get loaded.

6.37.1 Detailed Description

Utility class used to save/load the CellMap from a Stream.

6.37.2 Member Function Documentation

6.37.2.1 LoadMapFromStream()

```
static bool Structure2D.Utility.SaveManager.LoadMapFromStream (
            Stream stream,
            bool allowCrossVersionLoading = false )  [inline], [static]
```

Initializes the CellMap with the Map from the given stream

Parameters

stream	Stream from which we should load the Map
allowCrossVersionLoading	Specifies if a Map with a different ProjectVersion can be loaded

Returns

6.37.2.2 SaveMapToStream()

```
static void Structure2D.Utility.SaveManager.SaveMapToStream (
            Stream stream )  [inline], [static]
```

Saves the currently active Map to the given stream

Parameters

stream	Stream to which we write the Map

6.37.3 Member Data Documentation

6.37.3.1 OnLoadedCell

```
Action<BinaryReader, Coordinate> Structure2D.Utility.SaveManager.OnLoadedCell  [static]
```

If you use OnSavedCell to save your own custom data use this to read it back when the cells get loaded.

6.37.3.2 OnSavedCell

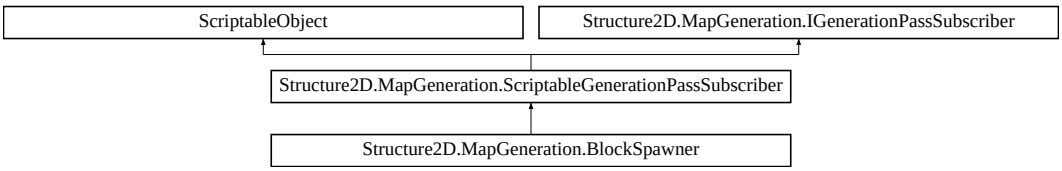
```
Action<BinaryWriter, Coordinate> Structure2D.Utility.SaveManager.OnSavedCell  [static]
```

This will be called for every Cell that gets serialized You can use the given writer to write your own data to the stream.

6.38 Structure2D.MapGeneration.ScriptableGenerationPassSubscriber Class Reference

Subscriber which you can add to the Map Generator to run your own MapGenPasses.

Inheritance diagram for Structure2D.MapGeneration.ScriptableGenerationPassSubscriber:



Public Member Functions

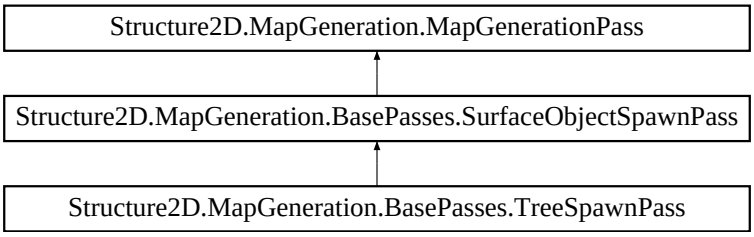
- virtual MapGenerationPass[ ] **GetPasses** ()
- virtual int **FetchPassOrder** ()
- int **PastProgressionWeight** ()

6.38.1 Detailed Description

Subscriber which you can add to the Map Generator to run your own MapGenPasses.

6.39 Structure2D.MapGeneration.BasePasses.SurfaceObjectSpawnPass Class Reference

Inheritance diagram for Structure2D.MapGeneration.BasePasses.SurfaceObjectSpawnPass:



Classes

- struct ObjectSpawnData

Public Member Functions

- override void PrepareGeneration ()

  This is called before the generation gets started on the separate thread, you can use this to prepare things that are only possible on the main thread.
- override void Apply (MapGenerator mapGenerator)

  Override this to add your Pass logic.

Protected Member Functions

- virtual int[ ] GetRandomSpawnPoints (MapGenerator mapGenerator)

  This returns an array of random usable spawn points, which each have a random distance in range of min and max spawn distance to one another.
- virtual void SpawnObject (Coordinate spawnCoordinate, MapGenerator mapGenerator)

  This is called for every object that the pass wants to spawn/. You can override this to add your own spawn logic.

Static Protected Member Functions

- static MapGenerator.ObjectSpawnQueueData **GetLayerParent** (int layer, MapGenerator mapGenerator)

Protected Attributes

- int **AmountOfObjectsToSpawn**
- int **MinSpawnDistance**
- int **MaxSpawnDistance**
- int **SpawnLayer**
- ObjectSpawnData[ ] **_spawnAbleObjects**

6.39.1 Member Function Documentation

6.39.1.1 Apply()

```
override void Structure2D.MapGeneration.BasePasses.SurfaceObjectSpawnPass.Apply (
            MapGenerator mapGenerator )  [inline], [virtual]
```

Override this to add your Pass logic.

Parameters

mapGenerator	This is the generator that calls the pass.

Reimplemented from Structure2D.MapGeneration.MapGenerationPass.

6.39.1.2 GetRandomSpawnPoints()

```
virtual int [] Structure2D.MapGeneration.BasePasses.SurfaceObjectSpawnPass.GetRandomSpawn↩
Points (
            MapGenerator mapGenerator )  [inline], [protected], [virtual]
```

This returns an array of random usable spawn points, which each have a random distance in range of min and max spawn distance to one another.

6.39.1.3 PrepareGeneration()

```
override void Structure2D.MapGeneration.BasePasses.SurfaceObjectSpawnPass.PrepareGeneration (
)  [inline], [virtual]
```

This is called before the generation gets started on the separate thread, you can use this to prepare things that are only possible on the main thread.

Reimplemented from Structure2D.MapGeneration.MapGenerationPass.

Reimplemented in Structure2D.MapGeneration.BasePasses.TreeSpawnPass.

6.39.1.4 SpawnObject()

```
virtual void Structure2D.MapGeneration.BasePasses.SurfaceObjectSpawnPass.SpawnObject (
            Coordinate spawnCoordinate,
            MapGenerator mapGenerator )  [inline], [protected], [virtual]
```

This is called for every object that the pass wants to spawn/. You can override this to add your own spawn logic.

Reimplemented in Structure2D.MapGeneration.BasePasses.TreeSpawnPass.

6.40 Structure2D.MapGeneration.TerrainNoise Class Reference

This is the Noise base class To add your custom Noise Map all you have to do is override the GetTerrain function and call SetCustomNoiseMap on the NoiseMap class

Public Member Functions

- virtual IEnumerable< float > GetTerrain (int width, int height, int seed)
- void **SetScale** (float settingsNoiseMapXScale, float settingsNoiseMapYScale)

Protected Member Functions

- float **GetXScale** (int width)
- float **GetYScale** (int height)

6.40.1 Detailed Description

This is the Noise base class To add your custom Noise Map all you have to do is override the GetTerrain function and call SetCustomNoiseMap on the NoiseMap class

6.40.2 Member Function Documentation

6.40.2.1 GetTerrain()

```
virtual IEnumerable<float> Structure2D.MapGeneration.TerrainNoise.GetTerrain (
            int width,
            int height,
            int seed )  [inline], [virtual]
```

Parameters

width	
height	
seed	

Returns

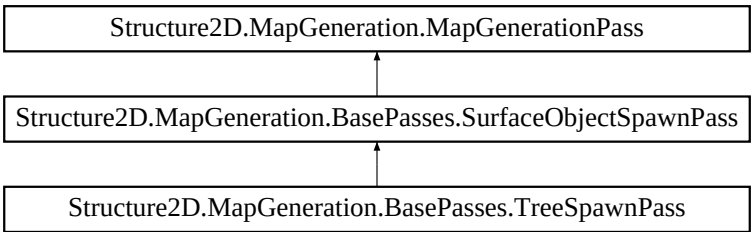
6.41 Structure2D.TerrainShaderExtensions Class Reference

Static Public Member Functions

- static void **SetBlock** (ref this Color32 color, byte block)
- static byte **GetBlock** (this Color32 color)
- static void **SetBackground** (ref this Color32 color, byte background)
- static byte **GetBackground** (this Color32 color)

6.42 Structure2D.MapGeneration.BasePasses.TreeSpawnPass Class Reference

Inheritance diagram for Structure2D.MapGeneration.BasePasses.TreeSpawnPass:



Public Member Functions

- override void PrepareGeneration ()

  This is called before the generation gets started on the separate thread, you can use this to prepare things that are only possible on the main thread.

Public Attributes

- int MaxTreeParts

  Max amount of parts a tree can have, without root and top.
- int MinTreeParts

  Min amount of parts a tree can have, without root and top.

Static Public Attributes

- const int **TreeSpawnPassPriority** = 15

Protected Member Functions

- override void SpawnObject (Coordinate spawnCoordinate, MapGenerator mapGenerator)

  This is called for every object that the pass wants to spawn/. You can override this to add your own spawn logic.

Additional Inherited Members

6.42.1 Member Function Documentation

6.42.1.1 PrepareGeneration()

```
override void Structure2D.MapGeneration.BasePasses.TreeSpawnPass.PrepareGeneration ( )  [inline],
[virtual]
```

This is called before the generation gets started on the separate thread, you can use this to prepare things that are only possible on the main thread.

Reimplemented from Structure2D.MapGeneration.BasePasses.SurfaceObjectSpawnPass.

6.42.1.2 SpawnObject()

```
override void Structure2D.MapGeneration.BasePasses.TreeSpawnPass.SpawnObject (
            Coordinate spawnCoordinate,
            MapGenerator mapGenerator )  [inline], [protected], [virtual]
```

This is called for every object that the pass wants to spawn/. You can override this to add your own spawn logic.

Reimplemented from Structure2D.MapGeneration.BasePasses.SurfaceObjectSpawnPass.

6.42.2 Member Data Documentation

6.42.2.1 MaxTreeParts

```
int Structure2D.MapGeneration.BasePasses.TreeSpawnPass.MaxTreeParts
```

Max amount of parts a tree can have, without root and top.

6.42.2.2 MinTreeParts

```
int Structure2D.MapGeneration.BasePasses.TreeSpawnPass.MinTreeParts
```

Min amount of parts a tree can have, without root and top.

6.43 Structure2D.Viewport Struct Reference

Public Member Functions

- bool ContainsCoordinate (Coordinate coordinate)

  Checks if the given coordinate is in the Viewport.

Public Attributes

- Coordinate BottomLeft

  Bottom left coordinate of the Viewport.
- int Width

  Width of the Viewport.
- int Height

  Height of the Viewport.

Properties

- static Viewport CurrentViewport `[get, set]`

  The current Viewport. This is set by the ChunkLoader.

6.43.1 Member Function Documentation

6.43.1.1 ContainsCoordinate()

```
bool Structure2D.Viewport.ContainsCoordinate (
            Coordinate coordinate )  [inline]
```

Checks if the given coordinate is in the Viewport.

Parameters

coordinate	Coordinate to check.

Returns

Returns whether the coordinate is in the viewport.

6.43.2 Member Data Documentation

6.43.2.1 BottomLeft

```
Coordinate Structure2D.Viewport.BottomLeft
```

Bottom left coordinate of the Viewport.

6.43.2.2 Height

```
int Structure2D.Viewport.Height
```

Height of the Viewport.

6.43.2.3 Width

```
int Structure2D.Viewport.Width
```

Width of the Viewport.

6.43.3 Property Documentation

6.43.3.1 CurrentViewport

```
Viewport Structure2D.Viewport.CurrentViewport  [static], [get], [set]
```

The current Viewport. This is set by the ChunkLoader.

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