Documentation

(Editor)

Contents

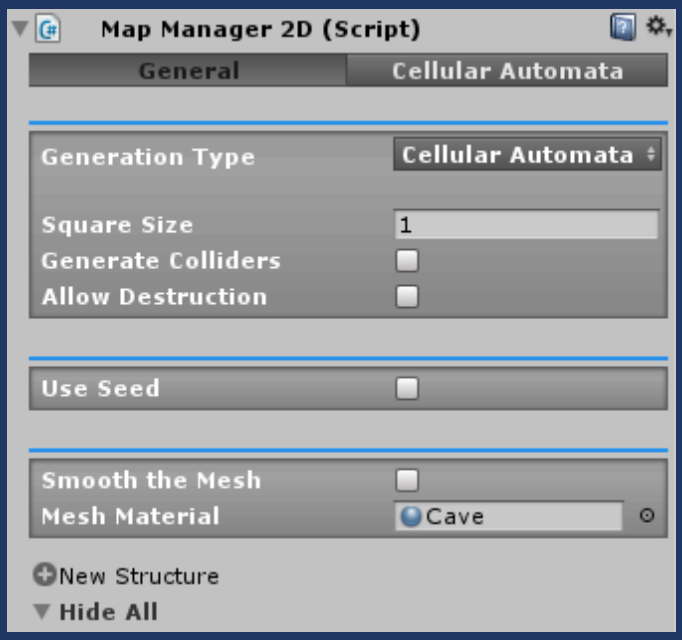
Thank you for purchasing GenX 2D framework!

This documentation will guide you through everything you need to know to start creating your own procedural worlds.

Setting up

To visually edit generation parameters, you need to add the ‘MapManager2D’script to any game object in your scene. You don't have to do it if you plan to utilize lower level functions and create maps yourself, or if you'll only work with static methods.

Keep in mind that there can't be more than one map manager script in the scene at a time.



Map Manager 2D in editor

Let's go through the parameters on the ‘General’ tab.

- **Generation Type:**

The type of generation to edit in the editor. All changes are saved between them so don't worry about switching them often.

Currently there are 3 generation types to configure in editor:

- *Cellular Automata*
- *Dungeon*
- *Terrain*

Well look at each of them in depth later.

- **Square Size:**

Size of one square in Unity units. Determines the scale of the output mesh.

- **Generate Colliders:**

If checked –colliders will be generated on the edges of maps.

- **Allow Destruction:**

Allows to destroy faces of the output mesh by calling 'DestroyCell' method.

- **Use Seed:**

Should generation be predetermined by a seed?

- **Smooth the Mesh:**

Enables smoothing the edges of the output mesh.

- **Mesh Material.**

- **Structures:** *(See page 14)*

Now let's go through each generation type.

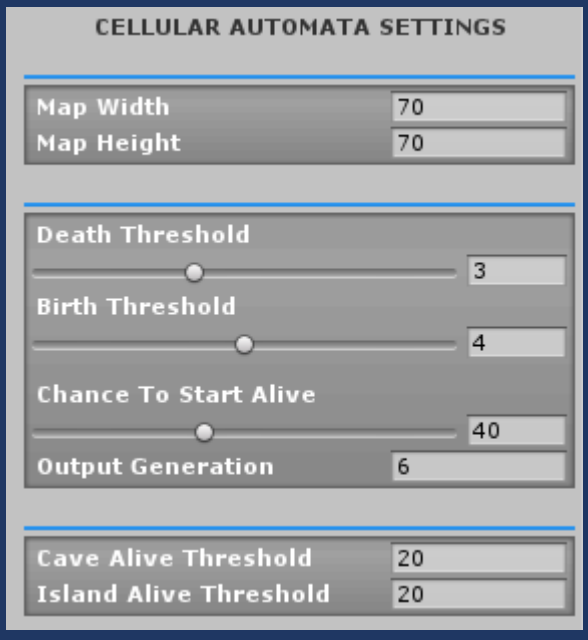
Cellular Automata

Output map is generated by applying a set of rules to a random initial map.

In a map, every cell can be either dead or alive (0 or 1, false or true). These are the rules:

- If a living cell has less living neighbours than ‘Death Threshold’ – it dies.
- If a dead cell has more living neighbours than ‘Birth Threshold’ – it becomes alive.

By repeating this simulation over and over we can get different shapes and structures, depending on the input values.



- **Map Width** and **Map Height**:

Determines the size of the map.

- **Death Threshold** and **Birth Threshold:**

See above.

- **Chance to Start Alive**

Chance a cell of the initial map will be alive. Determines the fullness of the map.

- **Output Generation**

Number of times a set of rules is applied.

However, raw output map is not perfect. It has tiny unrealistic caves, islands made up of single blocks etc. To get rid of those you can use the following variables:

- **Cave Alive Threshold:**

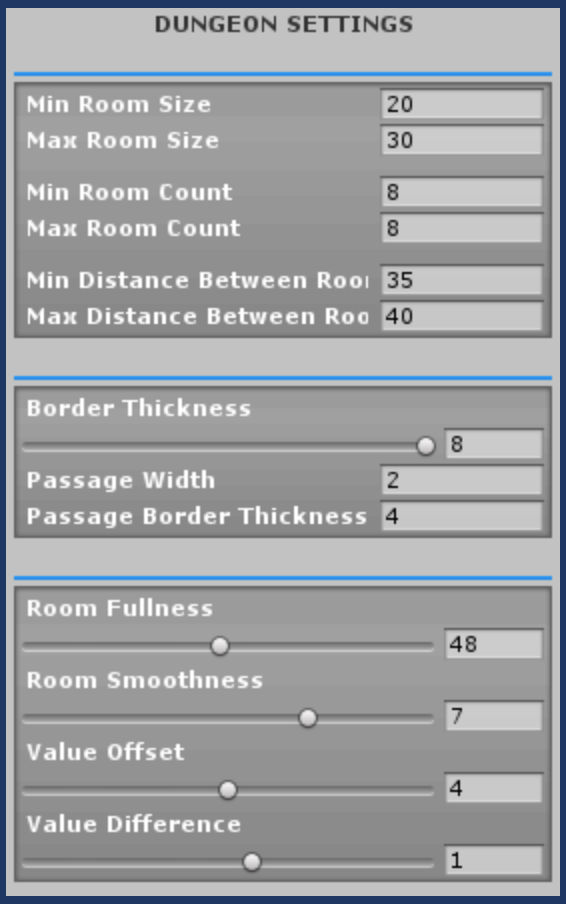
If a cave has less cells inside of It than this value, that cave is destroyed.

- **Island Alive Threshold:**

If an island has less cells inside of it than this value, that island is destroyed.

Dungeon

Generate a dungeon, made of individual rooms and connected with passageways.



- **Min** and **Max Room Size:**

Determines the min and max possible size of a single room.

- **Min** and **Max Room Count:**

Max and min number of rooms to generate.

- **Min** and **Max Distance Between Rooms:**

Min and max distance between any two rooms in a dungeon.

- **Border thickness:**

Thickness of every room's edges.

Passageway settings:

- **Passage Width:**

Width of all passageways.

- **Passage Border Thickness:**

Thickness of the border of every passageway. Make sure this value is always larger than *'Passage Width'!*

Room generation settings:

- **Room Fullness:**

Determines the fullness of a room.

- **Room Smoothness:**

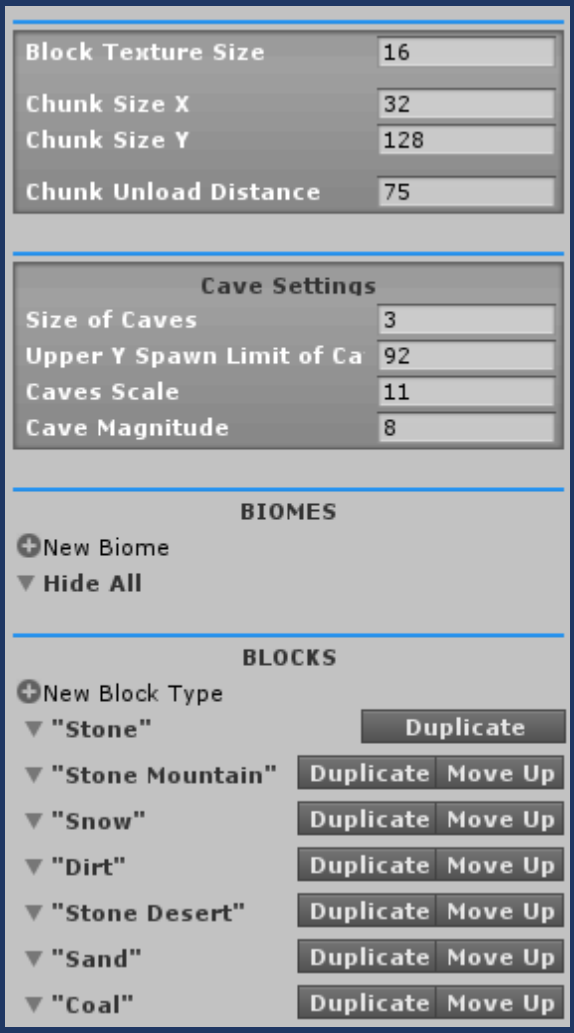
Determines the smoothness of a room.

- **Value Offset** and **Value Difference:**

Generation nature parameters. Different combinations give different results, play around with them to find what you need.

Terrain

Generate and dynamically load endless terrain, create biome and block types, set generation parameters for each block type and more.



- **Block Texture Size:**

Texture size of a single block. Textures of block types, that use only one texture will be resized at runtime, but block types that use tile maps must have all of their textures to be this size.

- **Chunk Size X** and **Y:**

X and Y size of a single chunk (in blocks).

- **Chunk Unload Distance:**

X-axis distance from the chunk to the main camera, at which that chunk is unloaded.

Cave Settings:

- **Size of Caves;**

- **Upper Y Spawn Limit of Caves:**

Max height at which caves can appear.

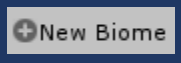
- **Caves Scale:**

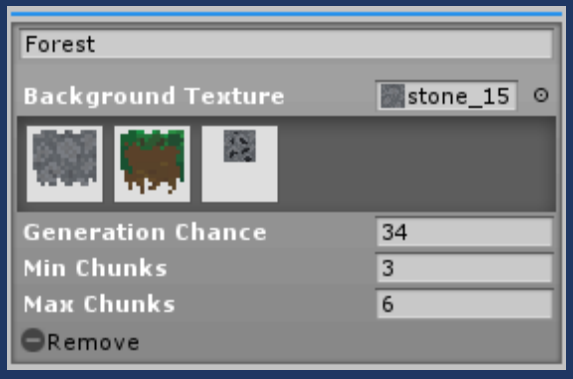
Scale of noise that is used to generate caves.

- **Cave Magnitude:**

Magnitude of noise that is used to generate caves.

Biomes

To add new biome click 



- **Name;**

- **Background Texture:**

Tile that will appear in the background of every chunk of this biome.

- **Every block that is assigned to this biome;**

- **Generation Chance:**

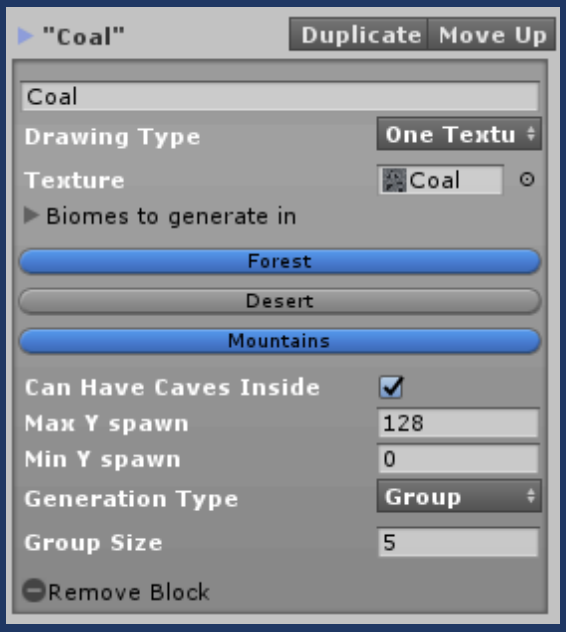
Spawn chance of this biome.

- **Min** and **Max Chunks:**

Min and max number of chunks in a single instance of this biome.

Blocks

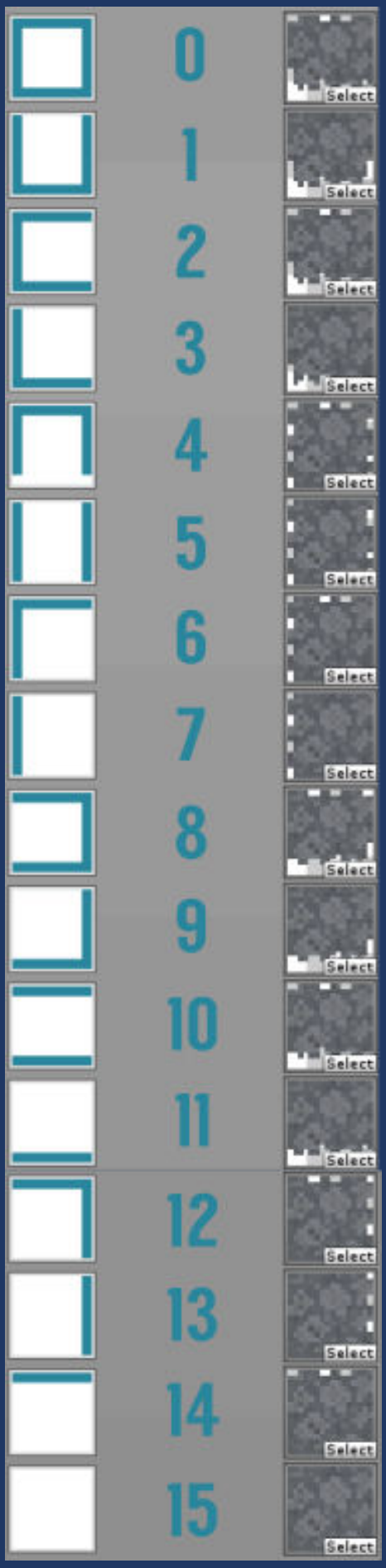
To add new block type click 



- **Name;**

- **Drawing Type:**

  - One Texture – this block type only has one texture.
  - Tile map –a total of 16 textures for any possible positional configuration of a block.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- **Biomes to generate in:**

List of biomes in which this block will be spawned.

- **Can Have Caves Inside;**

- **Max** and **Min Y Spawn:**

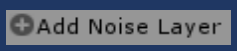
Max and Min height at which this block type can spawn.

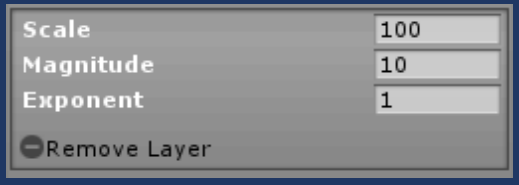
- **Generation Type:**

  - Group - 2D Perlin noise based generation.
    - Group Size –size of the groups.
  - Random - every block has a random chance of being this type
    - Spawn Chance –chance that a block will be of this type.
  - Range Y - 1D Perlin noise based generation;
    - Y Offset - global height offset of this block type.

Noise Layers

Layers of noise that define terrain generation.

To add a layer click 



- **Scale:**

Scale of this noise layer. Basically, the frequency of the noise.

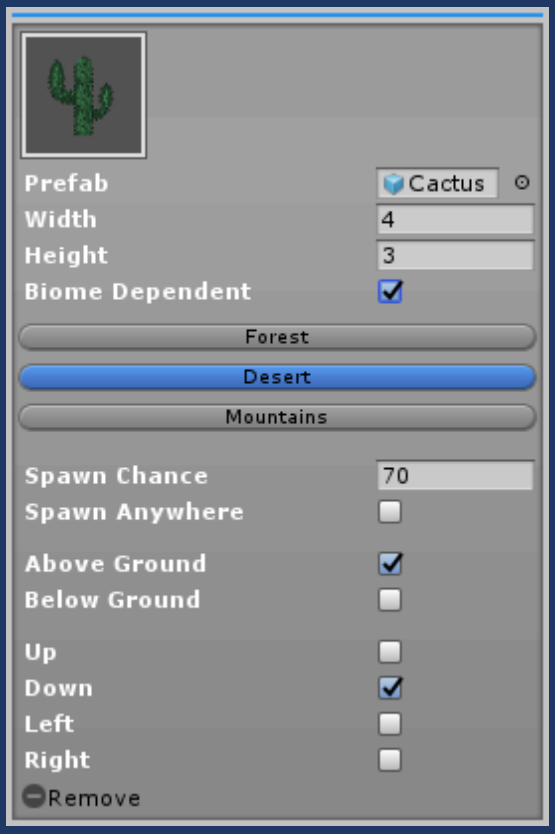
- **Magnitude:**

Magnitude of this noise layer. Larger value gives more difference between the highest and lowest possible point.

- **Exponent.**

Structures

Objects that are randomly spawned on the map.



- **Prefab:**

Prefab that is being instantiated.

- **Width** and **Height:**

Size of the area occupied by this object.

- **Biome Dependent:**

Should this object spawn only in the following biomes?

- **Spawn Chance.**

- **Spawn Anywhere:**

Position doesn't affect this object's spawning.

- **Above** and **Below Ground:**

Should the object spawn only above or only below the ground level (Only for Terrain)

- **Up, Down, Left, Right:**

Should the object spawn only near the ground to the side of it?