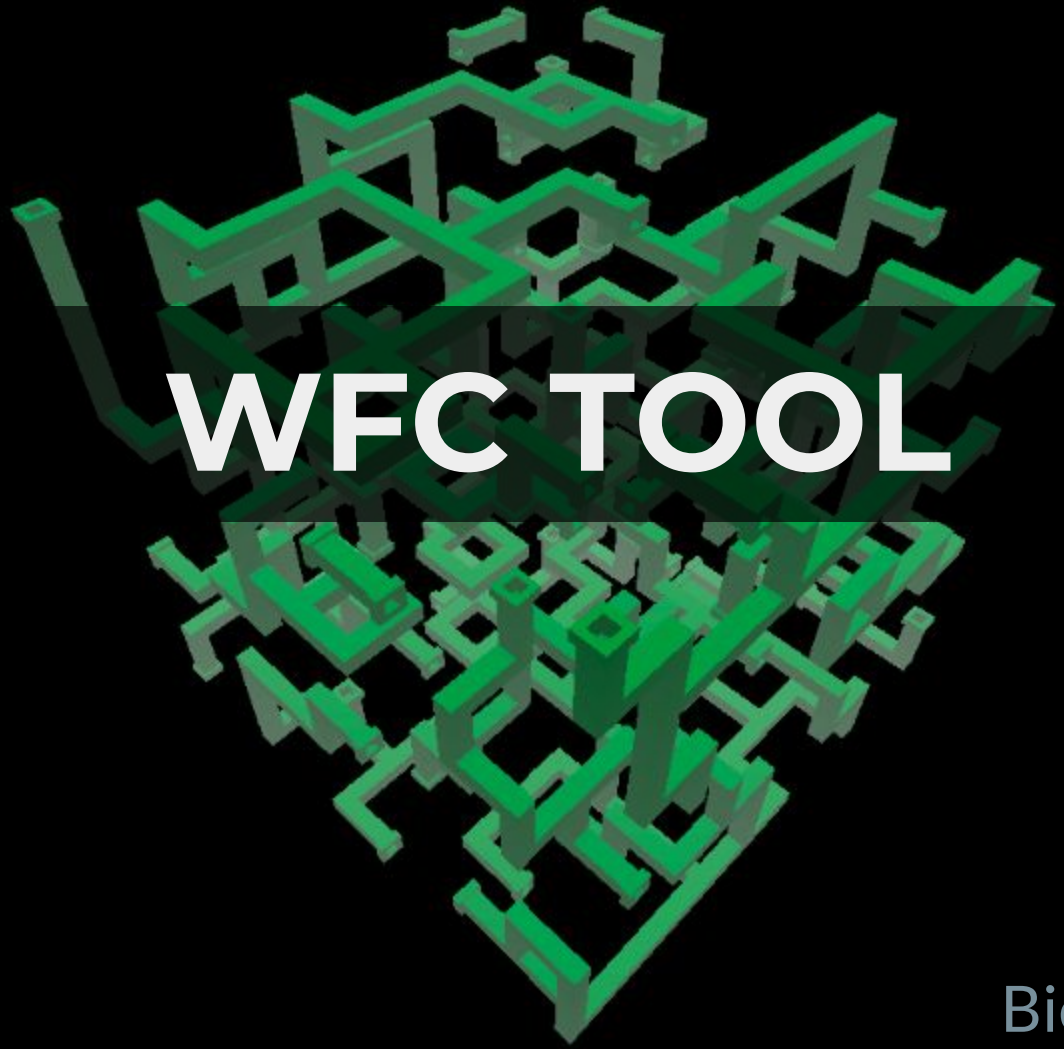
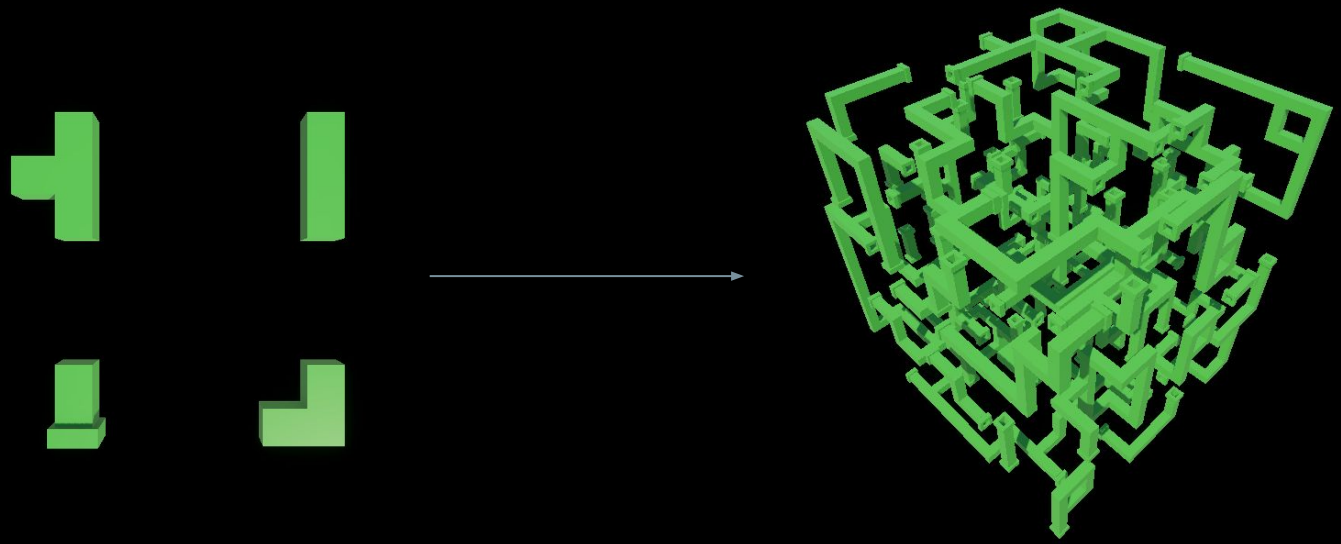


WFC TOOL

Created by
Biel Rabasa Galan

OVERVIEW

WFC_Tool is a Unity tool to create procedurally generated structures from square prefabs.



Currently, the tool is only supported by the Unity's URP.

OVERVIEW

The tool consists in **3 Scriptable Objects** & **2 GameObject Components**

Tile Set
stores prefabs

Representation Model (RM)
stores and manages generated structures

Rules
stores tile connection and possible rotation information

Printer
instanciates RM prefabs in scene

Solver
generates a final RM from rules with the WFC algorithm

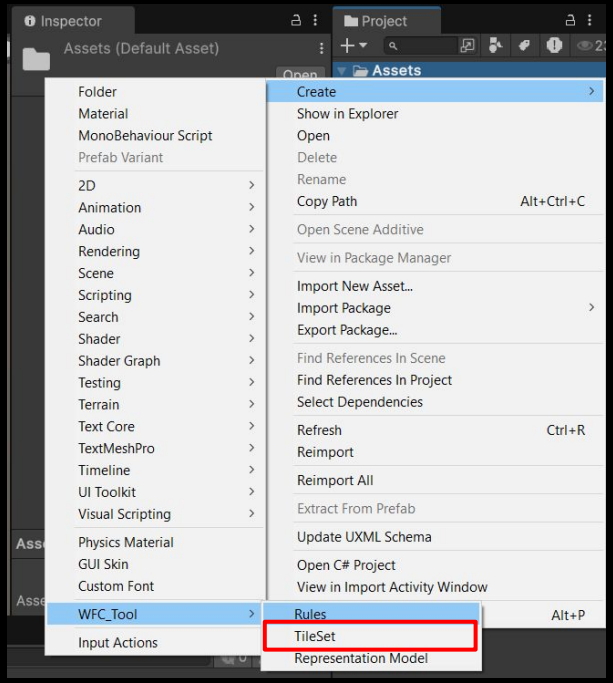
INDEX

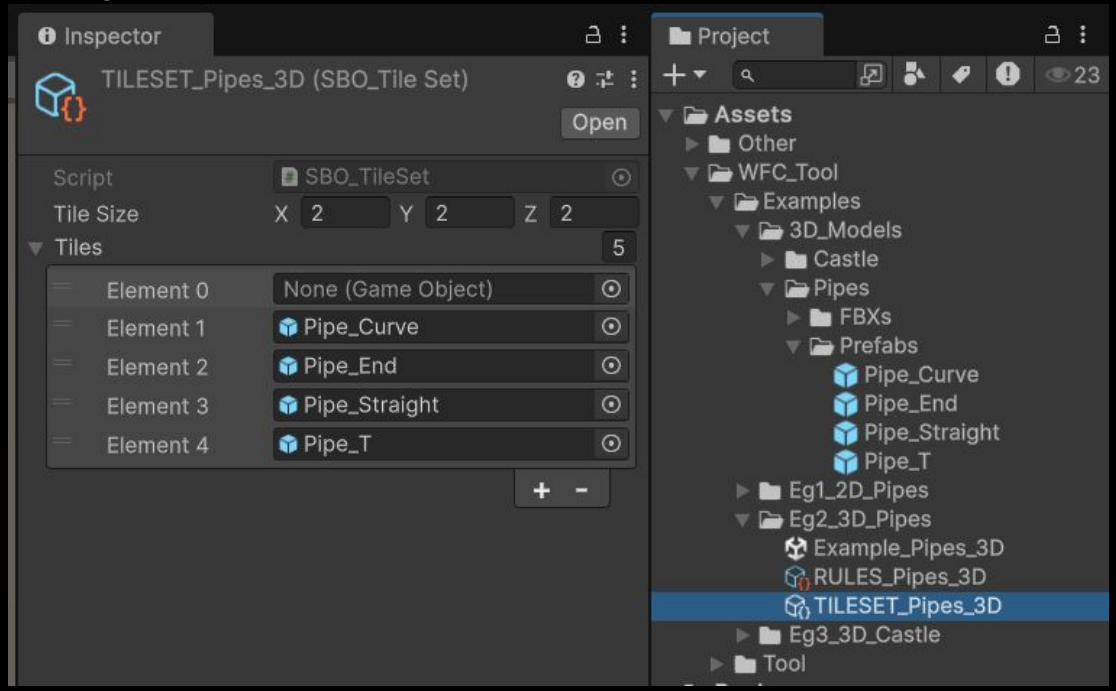
TILE SET

Stores all the prefabs to generate structures from.

TileSize: prefab sizes

Null elements act as empty GameObjects.

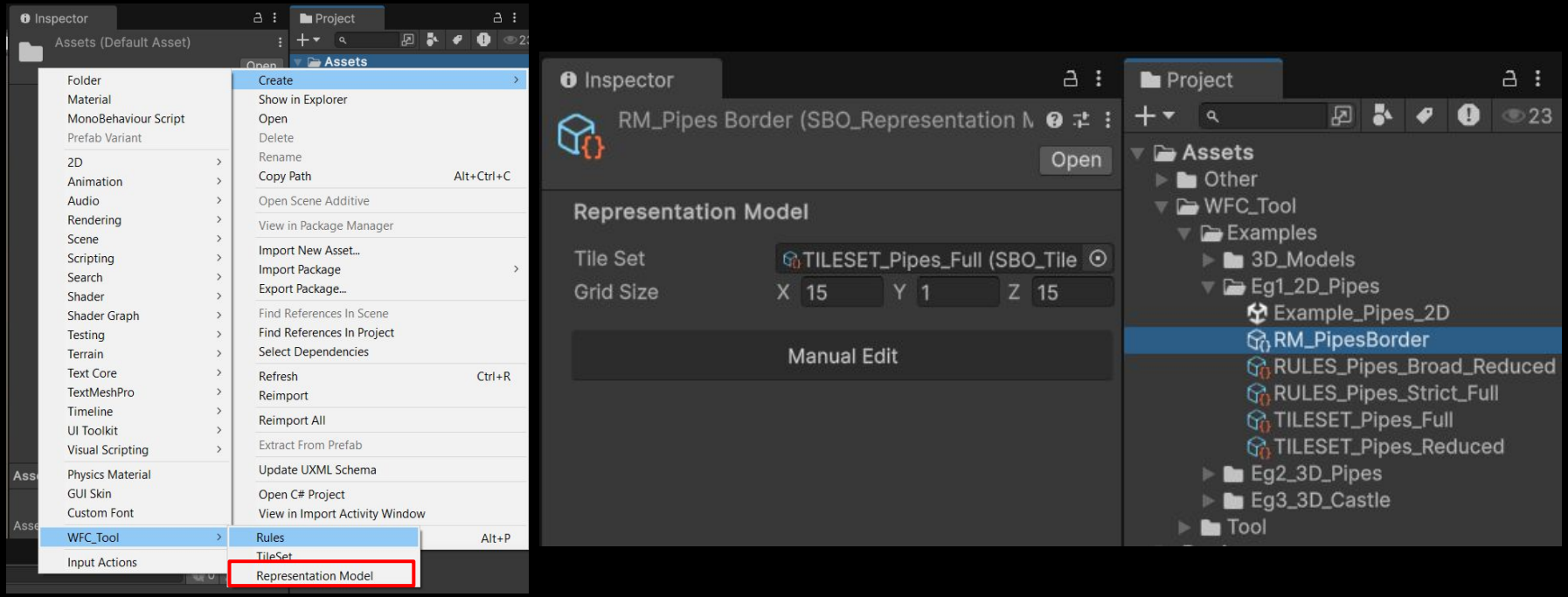




REPRESENTATION MODEL

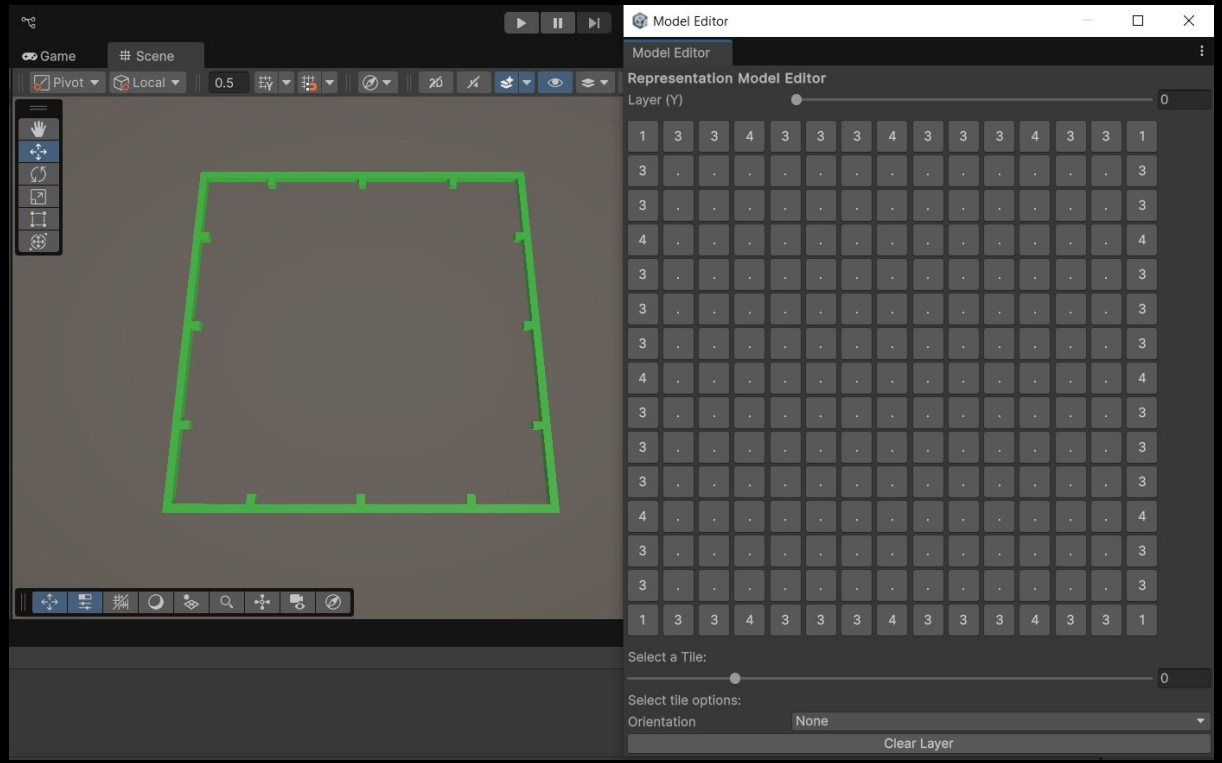
Stores a generated structure information.

GridSize: size of the structure.



REPRESENTATION MODEL

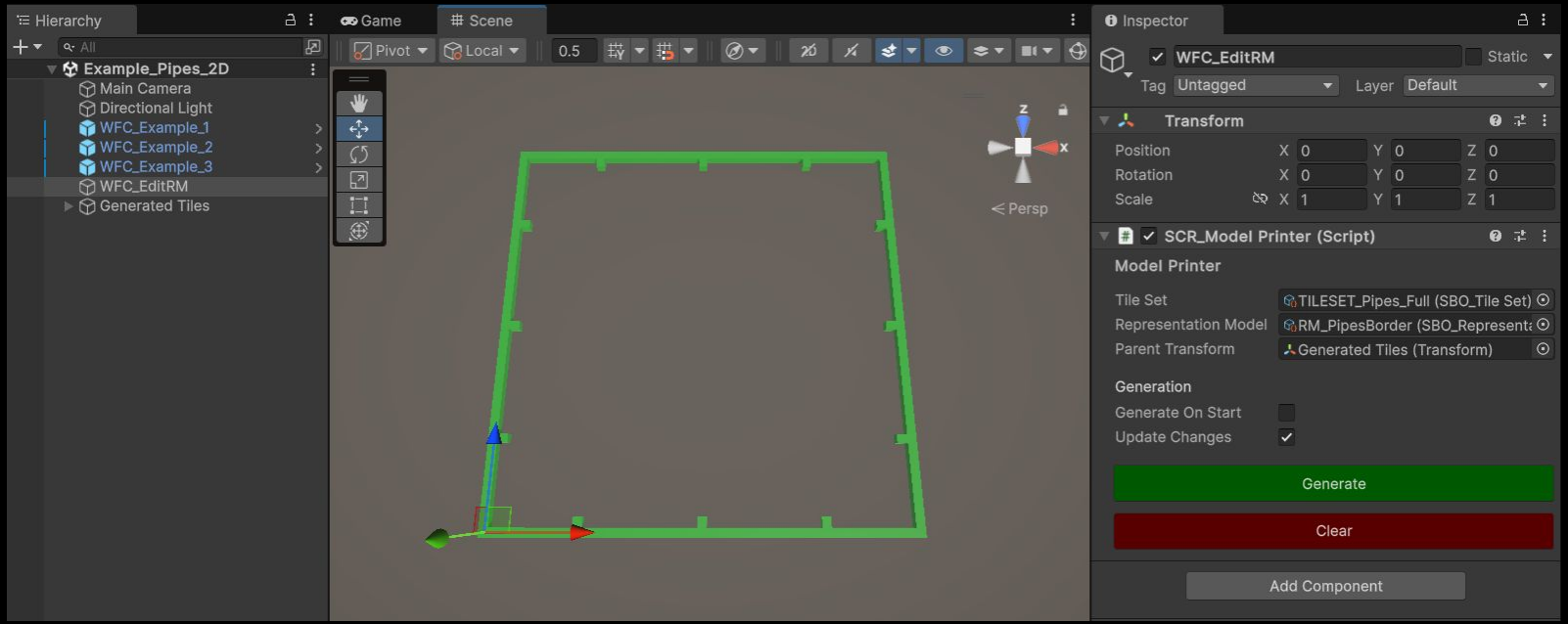
Manual Edit (*early stage*): Enables editing a Representation Model.



PRINTER

Instantiates Representation Models in a scene.

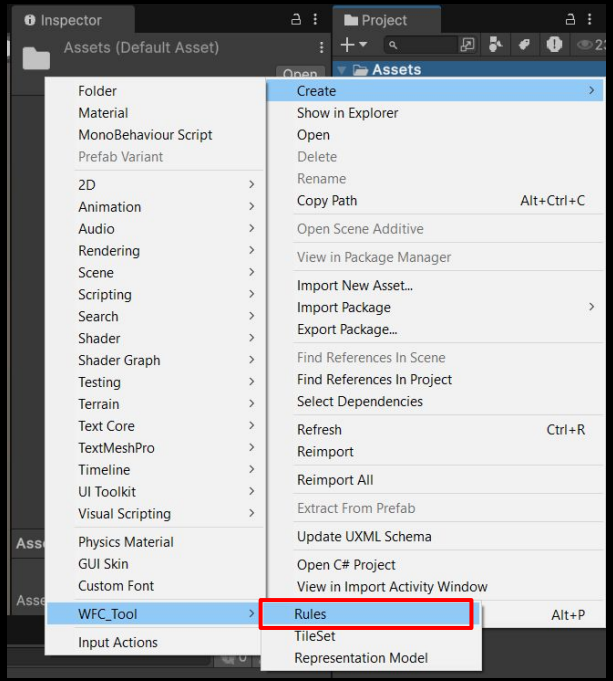
Update Changes: automatically regenerates prefabs when RM changes.

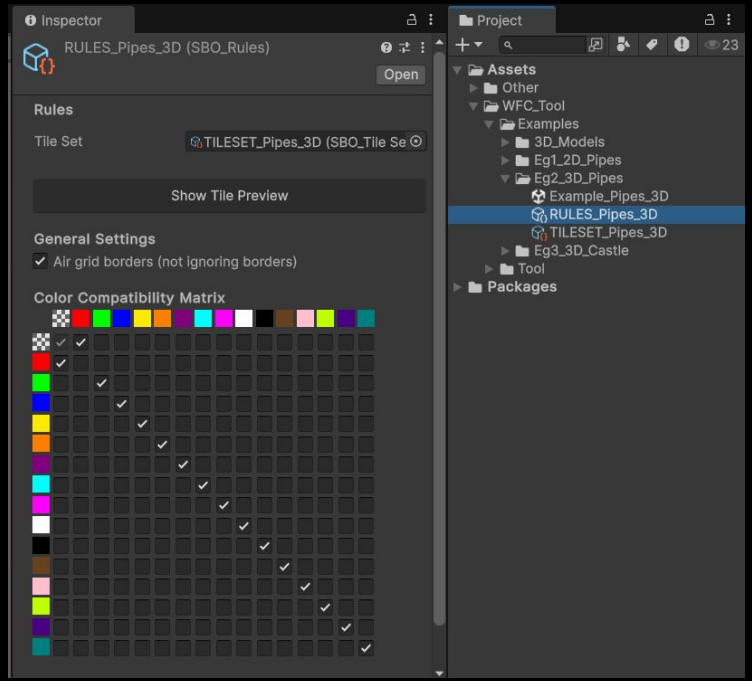


RULES

Stores the information on how tiles can appear and connect.

Show Tile Preview: enter edit mode.

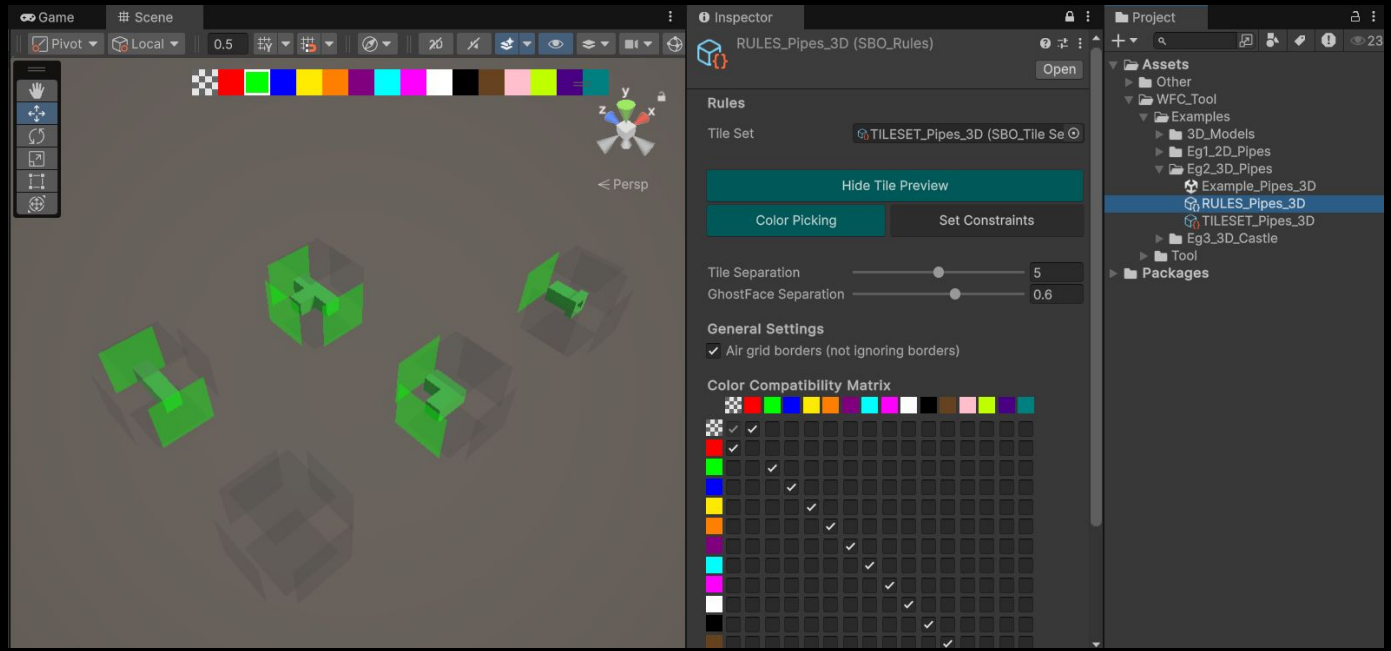




RULES COLOR PICKING

Face painting: each face can be painted with some or all colors.

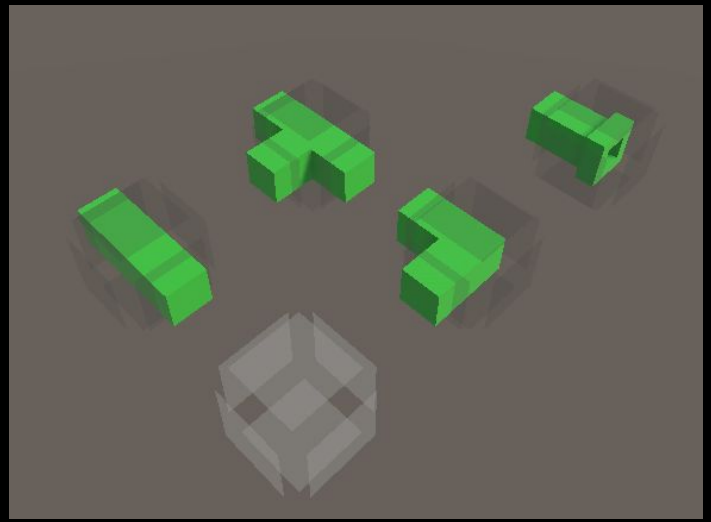
Color Compatibility Matrix: determines which colors can connect and which not (it is additive, if only one color is compatible with another tile, tiles will connect).



RULES COLOR PICKING

Air Grid Borders: Interact with borders as if they are painted with the transparent/checker color (only faces painted with compatible colors will be able to touch the border).

Note: if the prefabs exceed Ghost Faces size, either the prefab is too big, or Tile Set / Tile Size is not correct.

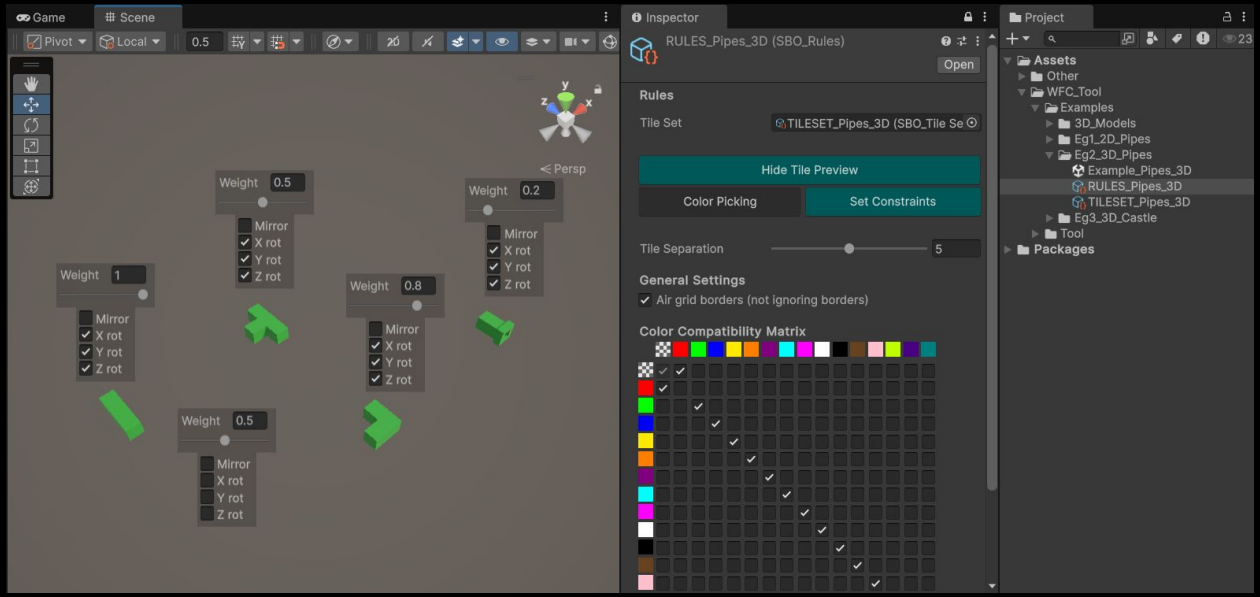


RULES CONSTRAINTS

Determines how tiles can appear & rotate.

Weight: probability of a tile to be chosen against another.

Rotation: axis in which tiles can appear rotated (selecting more than 1 axis will make tiles appear rotated in all axis).

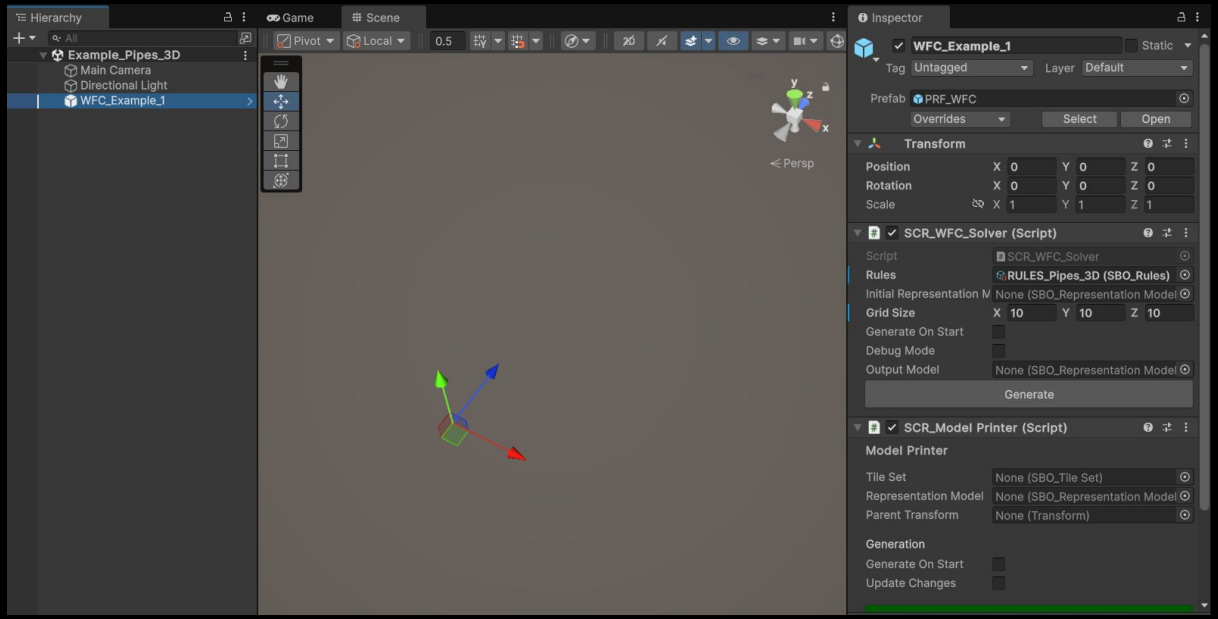


SOLVER

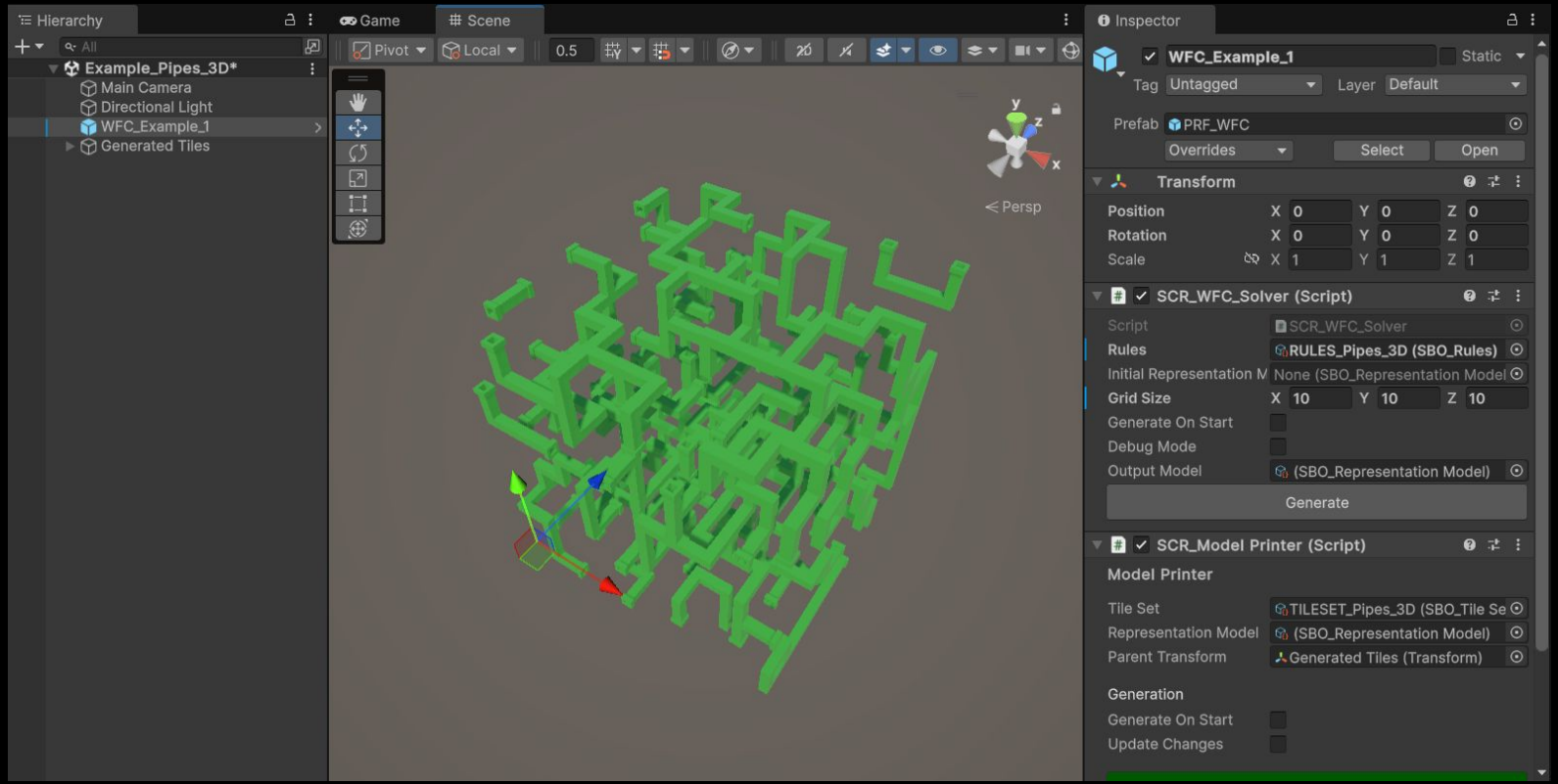
Generates a structure with *GridSize* from the Rules.

Outputs a Representation Model, that will automatically print from Model Printer.

Initial Representation Model: generation starts with a RM as a base.



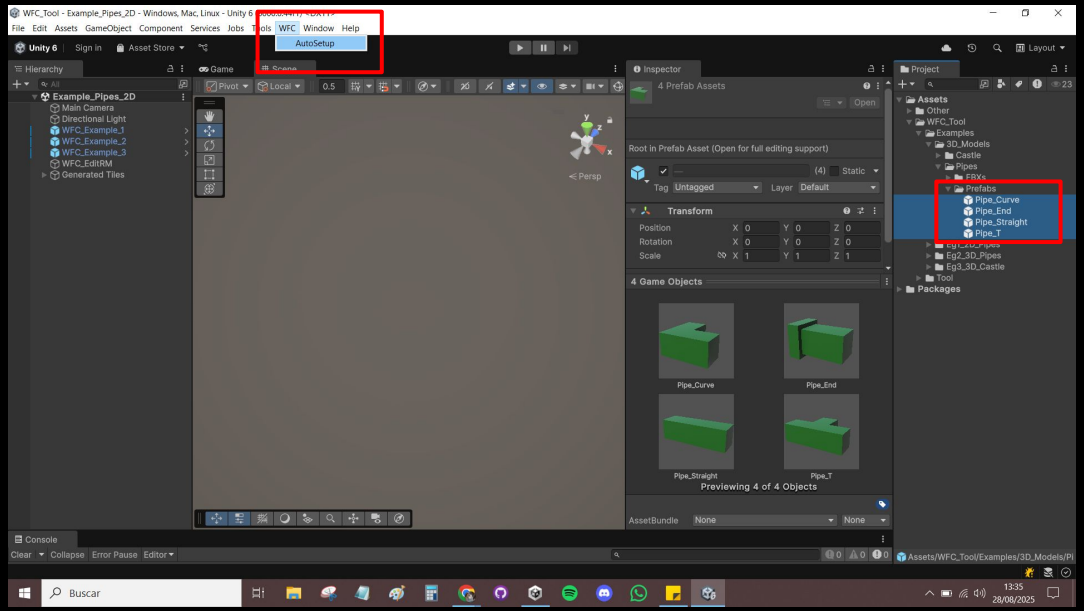
SOLVER


Hierarchy
Example_Pipes_3D*
Main Camera
Directional Light
WFC_Example_1
Generated Tiles
Game
Scene
Pivot
Local
Persp
Inspector
WFC_Example_1
Static
Tag Untagged
Layer Default
Prefab PRF_WFC
Overrides
Select
Open
Transform
Position
Rotation
Scale
SCR_WFC_Solver (Script)
Script SCR_WFC_Solver
Rules RULES_Pipes_3D (SBO_Rules)
Initial Representation M None (SBO_Representation Model)
Grid Size X 10 Y 10 Z 10
Generate On Start
Debug Mode
Output Model (SBO_Representation Model)
Generate
SCR_Model Printer (Script)
Model Printer
Tile Set TILESET_Pipes_3D (SBO_Tile Se
Representation Model (SBO_Representation Model)
Parent Transform Generated Tiles (Transform)
Generation
Generate On Start
Update Changes

STEPS TO GENERATE A STRUCTURE

1) Prepare all prefabs for the generation (all must have the same size)

2) Select all prefabs and **AutoGenerate** (creates a TileSet, Rules & Solver automatically)

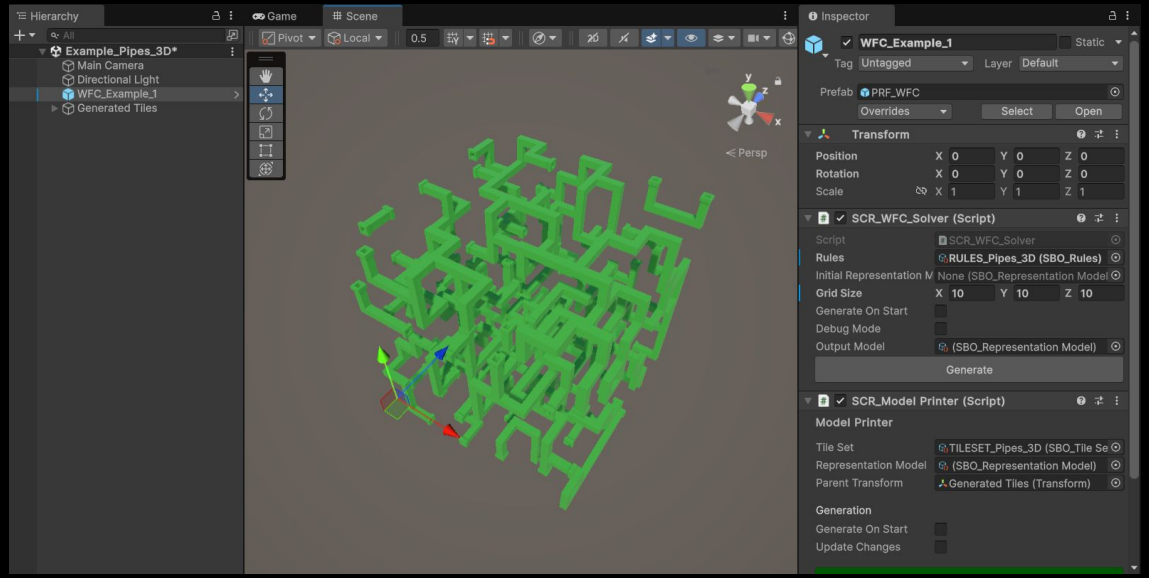


STEPS TO GENERATE A STRUCTURE

3) **Modify TileSet**: set size, modify prefabs as needed.

4) **Modify Rules**: set Constraints, set Colors, modify Color Compatibility Matrix.

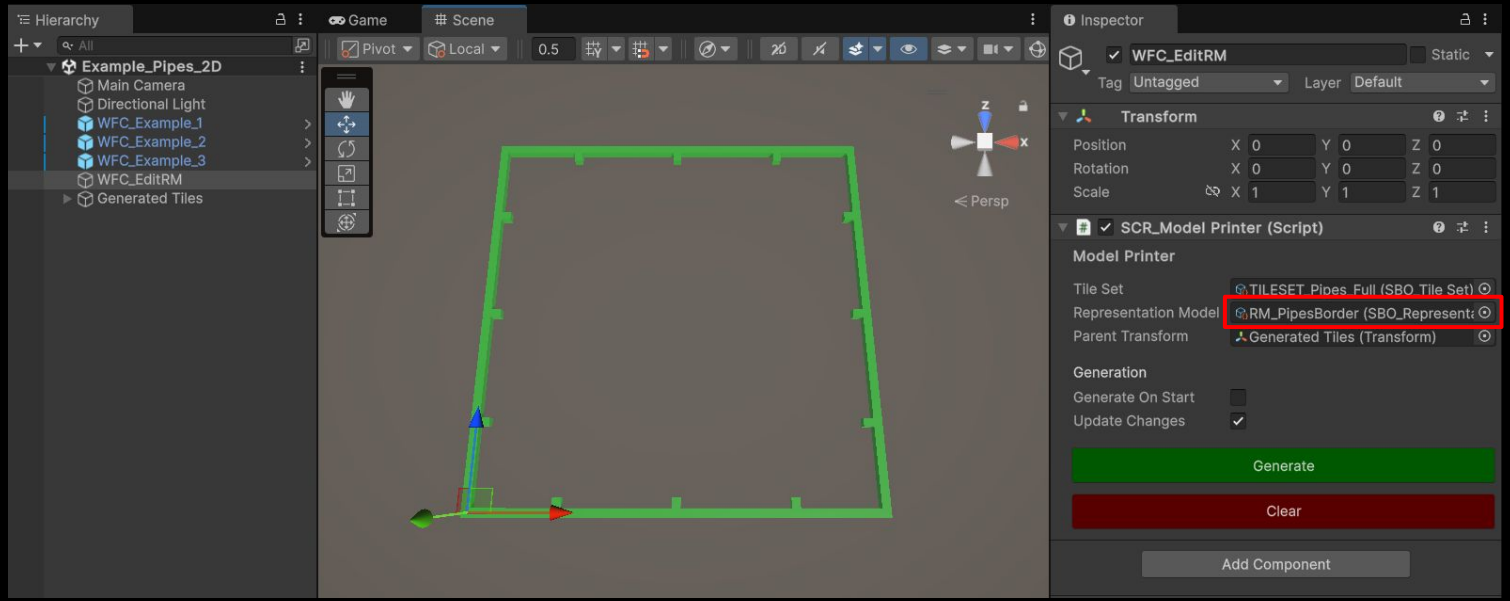
5) **WFC Prefab**: set GridSize & Generate!



GENERATE A STRUCTURE FROM A RM

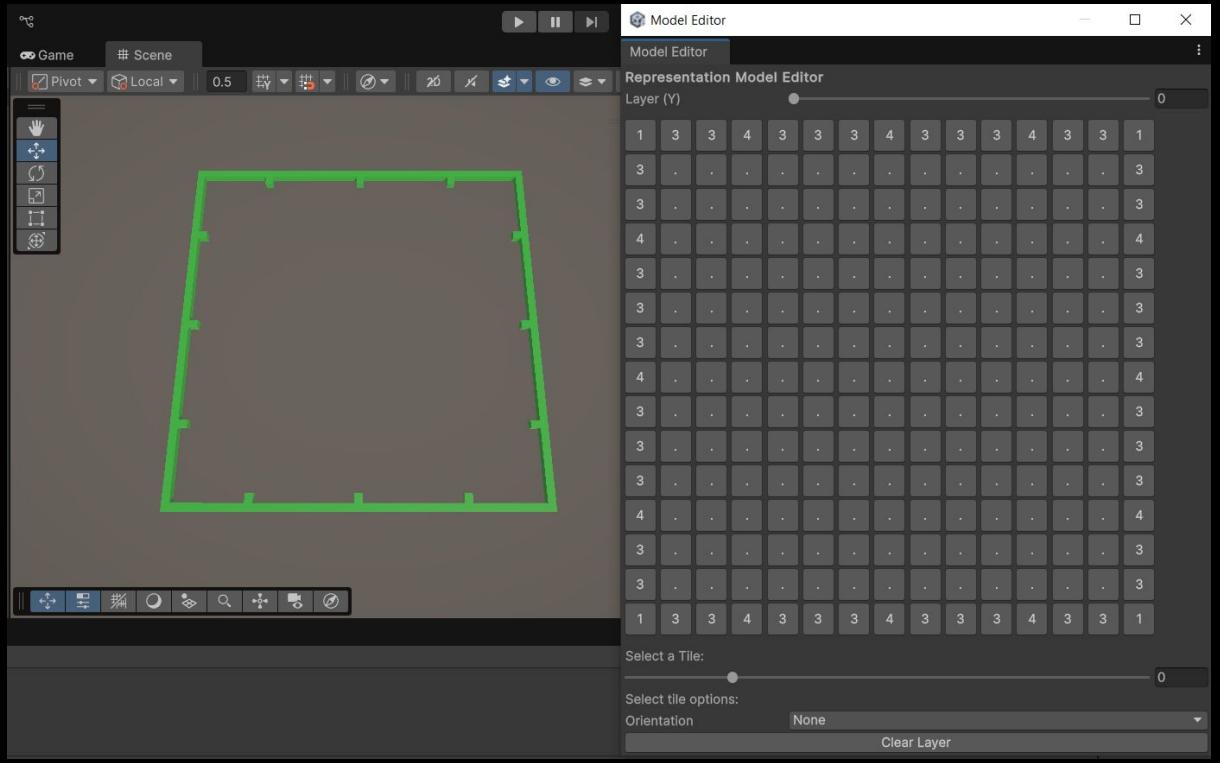
1) Create a **Representation Model**: Set TileSet & GridSize

2) Create a **Model Printer** in the scene: Set TileSet, the RM created & Update Changes.



GENERATE A STRUCTURE FROM A RM

3) Edit the Representation Model



GENERATE A STRUCTURE FROM A RM

4) Set a **Solver** in the scene: RM as InitialRepresentationModel & same GridSize.

5) Generate!