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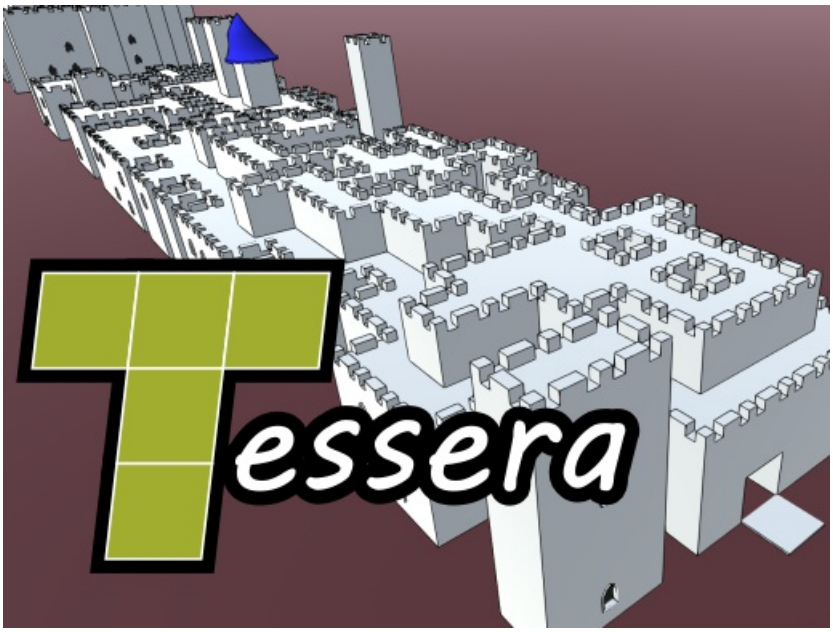



**Tessera** is a Unity addon for procedurally generating 3d tile-based levels and builds. Get it here.

---

Tessera works by running the Wave Function Collapse algorithm. This algorithm is a powerful technique for generating maps from complicated tile sets with tight controls on behaviour.

For help, contact use Discord or post on the Unity forums.

These docs contains tutorials and class based documentation for Tessera v4.0.0.

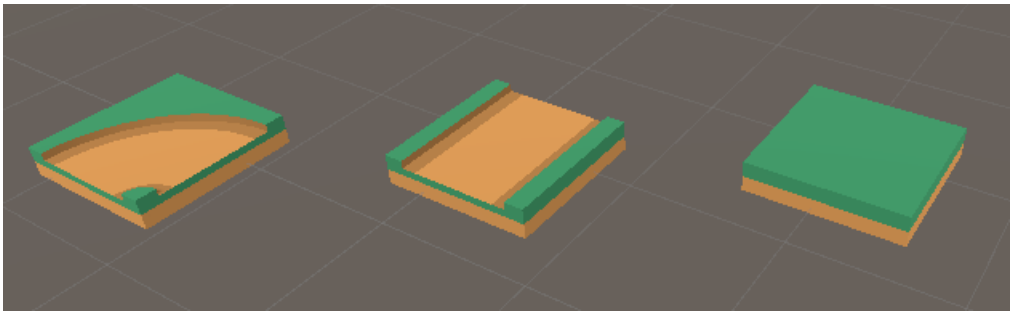
# Getting Started Tutorial

## Setup

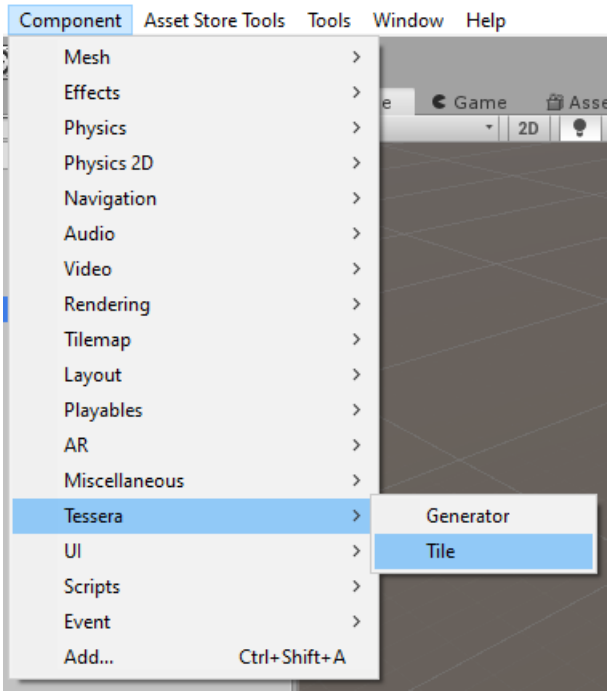
Start a new project. Then download Tessera from the Unity Asset Store and import it to your unity project. For this tutorial, we'll also use use Kenney's Tower Defense Kit so either download that or use the files included in `Samples/GrassPaths/Models`.

## Creating tiles

Lets create some tiles. From the tower defense assets, drag the prefabs for `tile`, `tile_cornerRound` and `tile_straight`. These tiles are a small selection of grass and path tiles.



Then, with those game objects selected, add the `TesseraTile` component from the menu.



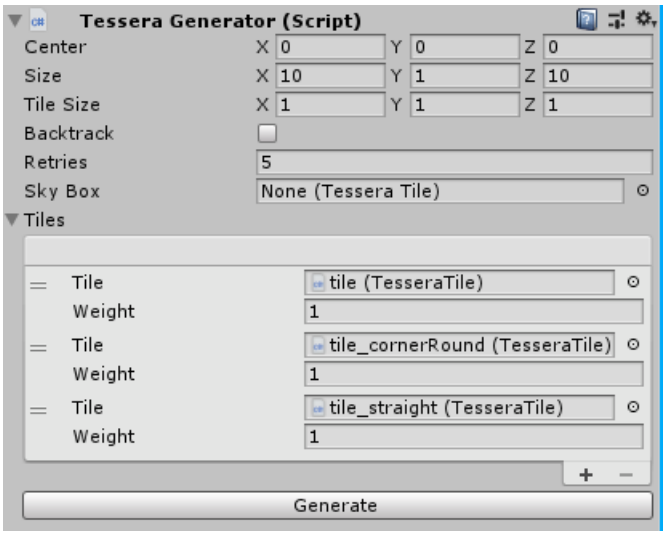

That's all for now, we'll configure the tiles later.

## Creating the generator

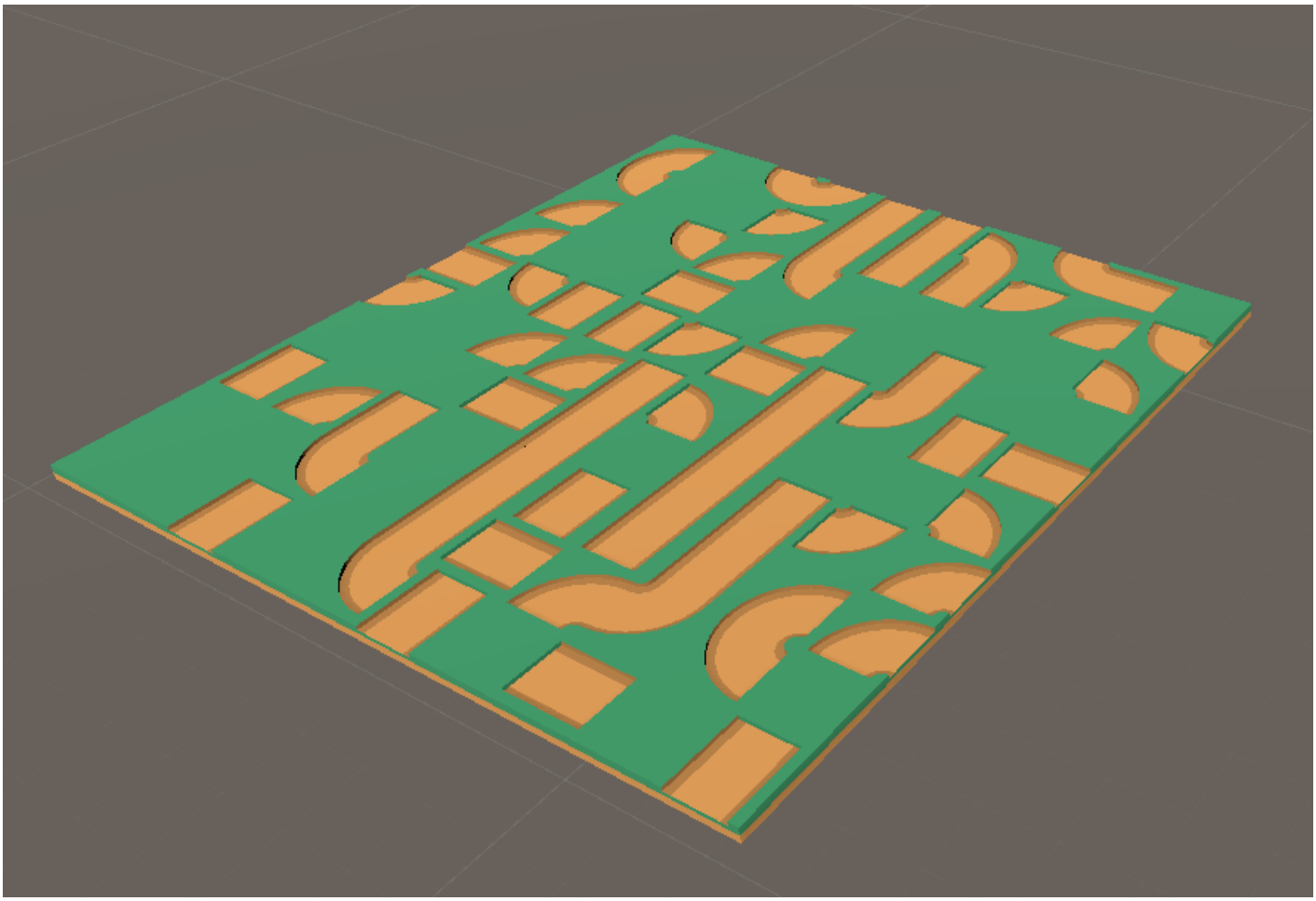
Next, create a new empty GameObject, and give it the `TesseraGenerator` component from the menu. Bring it up in the inspector. Add the tiles we created before to the list of tiles, either by dragging them from the hierarchy onto the Tiles section, or clicking the small plus button and selecting each tile.

Position the generator so that it does not overlap the tiles you created.

Afterwards, your configuation should look like this:




Now press the "Generate" button to create a new arrangement of those three tiles. You should get something looking like this:



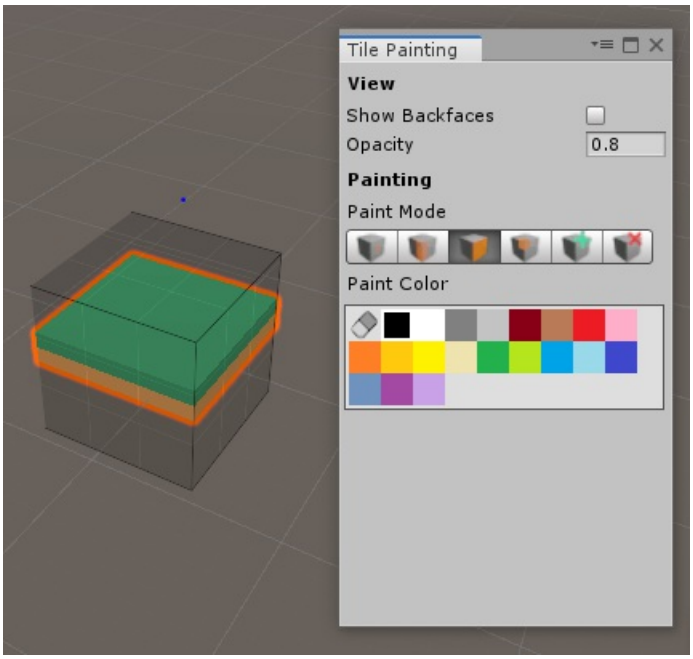
It's generated the tiles, but right now it doesn't know which tiles can be placed next to which other ones. So it has just placed them randomly. Hit undo to delete the created tiles.

To fix this, we need to paint the tiles.

## Tile painting

Select the first tile, called `tile`. In the inspector, click the "paint faces" button.  .

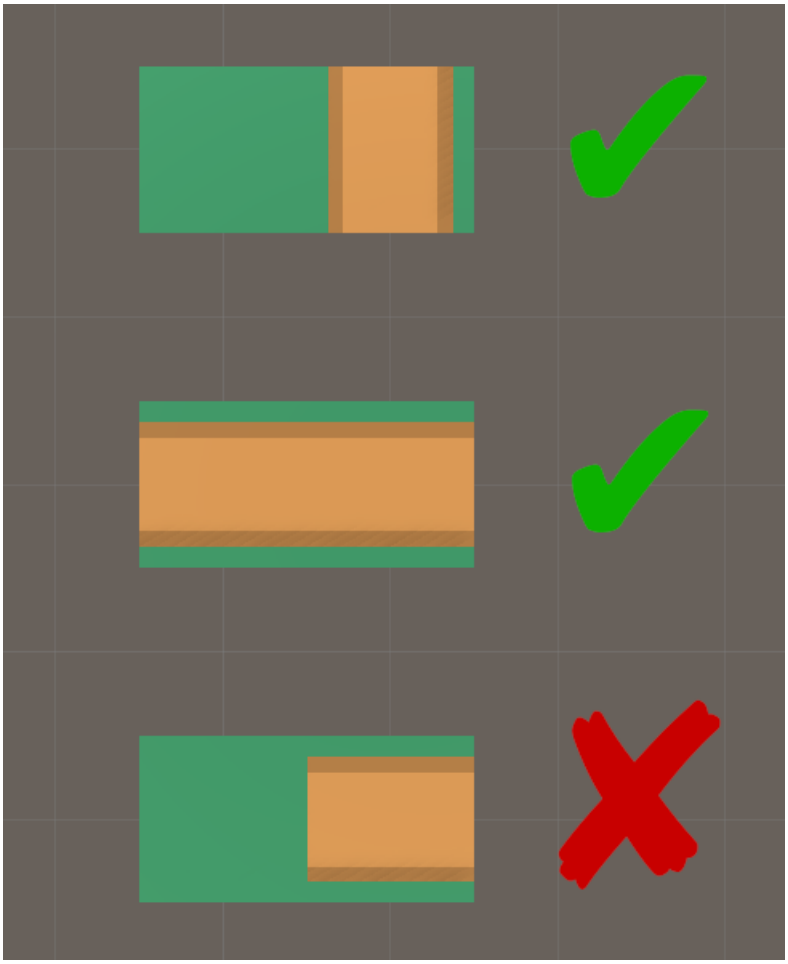
This should pop-up a "Tile Painting" window, and also show a semi-transparent cube around the tile.




You can use these tools to paint different colors onto the tile's cube. First, select a paint color from the palette, the click on the cube to apply that color. If you make a mistake, select the eraser from the palette and clear what has been painted.

**Tiles can only connect to each other if they have matching colors painted on their corresponding faces**. Specifically, each face is divided subdivided into 9 squares. A pair of adjacent tiles are compared by pairing up the squares on the opposing faces, and seeing if they match. Squares match if they are both the same color, or if either square is transparent, though this can be customized with a Palette.

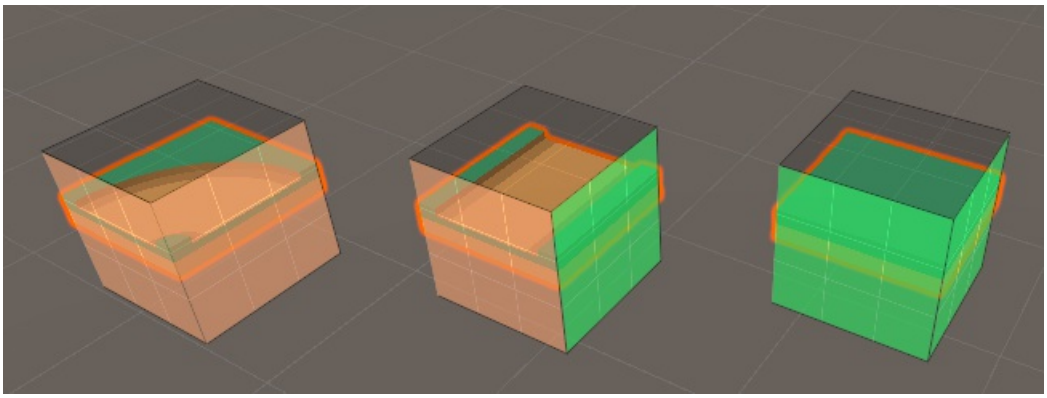
In this case, we want tiles to connect to each other if they are both grassy, or if they are both a path, but do not want paths to lead straight into grass.



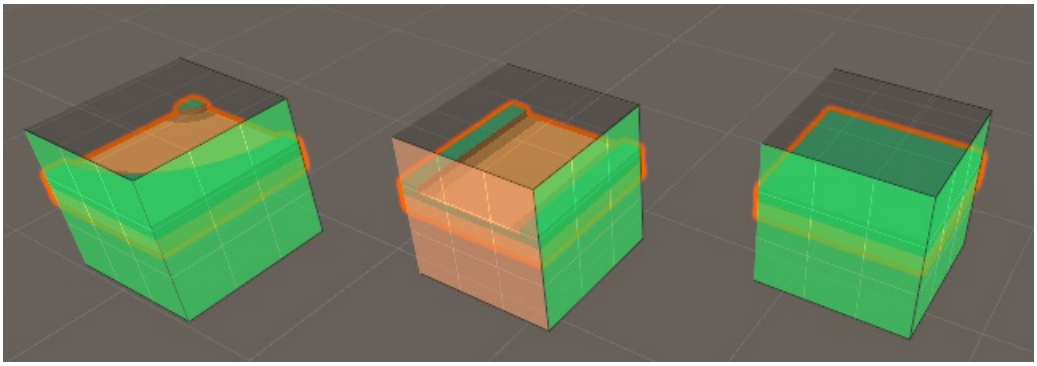
In order to achieve this, we will paint all the grassy faces of each tile green, and all the faces with paths brown. The top and bottom we will leave alone. That will connect grass to grass, paths to paths, and disallow grass connecting to paths.

Paint all 4 sides of the 3 tiles now. Afterwards, you should have three tiles that look like this.

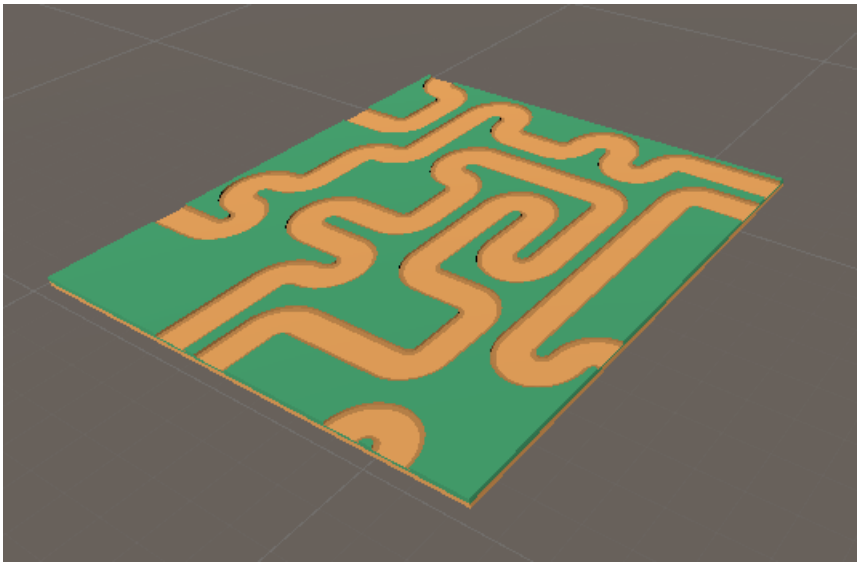
Front view:



Rear view:



Now we can go to the generator and press the "Generate" button again. Make sure you have deleted the tiles it created the first time around as it won't overwrite already generated tiles. If everything is set up correctly, it should look like this.



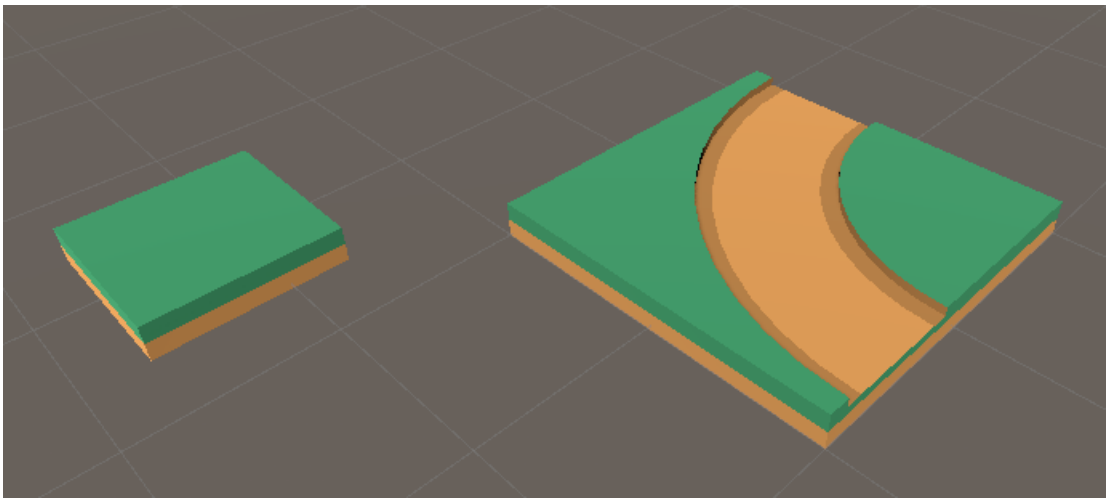
This concludes the tutorial. From here you can experiment with some of the settings in the inspector, try adding more tiles from the tower defense assets, or read the more advanced tutorials.

# Big Tiles Tutorial

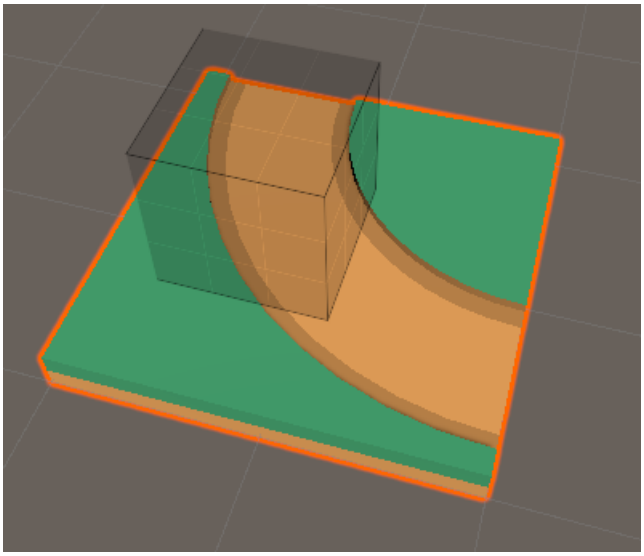
*This tutorial continues from the Getting Started tutorial. It is recommended you complete that one before starting this.*

So far we've looked at generating game objects that all have the same size. That is convenient, but the clear grid structure is not always desired. Here we look at one way of addressing that. If normal tiles only occupy one cell in the output, the big tiles can straddle several. That means you can design a larger set piece cohesively.

Let's add a new tile from Kenney's Tower Defense Kit. This time, pick `tile_cornerLarge`. It is twice as bit as a regular tile in each dimension.



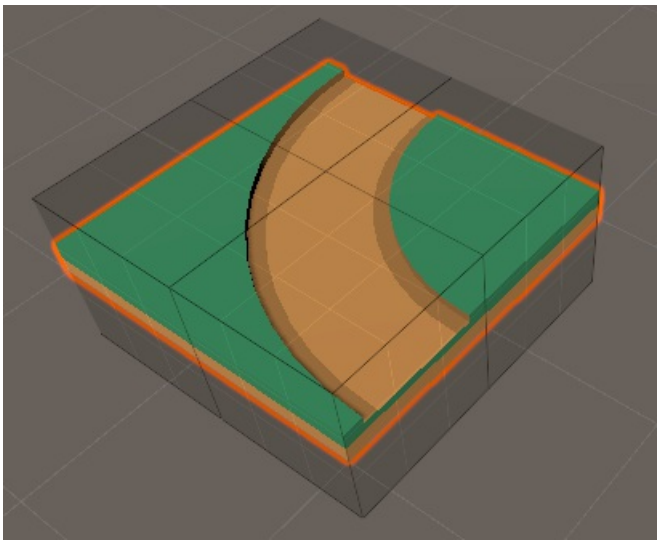
Lets set it up. As before, add the TesseraTile component. Then set the Center to (-0.5, 0, -0.5). This will place the paintable cube in one corner of the tile.



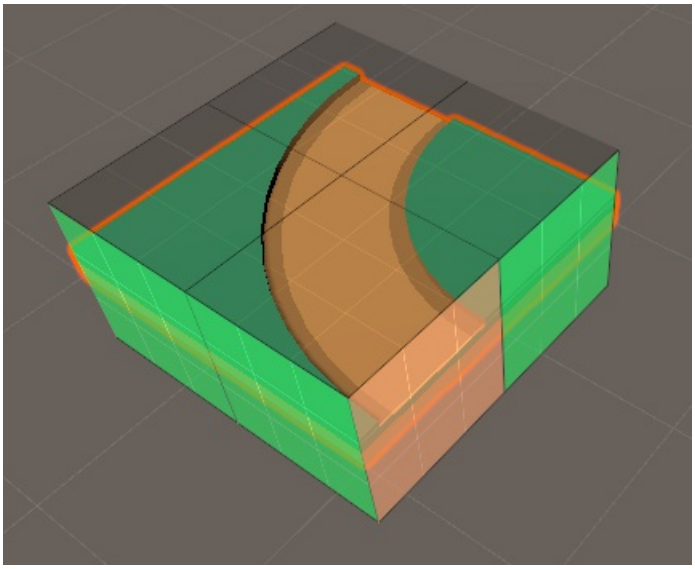
Then select the "Add Cube" tool from the paint menu  . You can now click on faces of the paintable cube to make a tile with multiple cubes in it. If you make a mistake, you can use the "Remove Cube" tool to delete them.

*Note: Big Tiles should have the same Tile Size as other tiles. You must use the Add Cube tool to make big tiles*

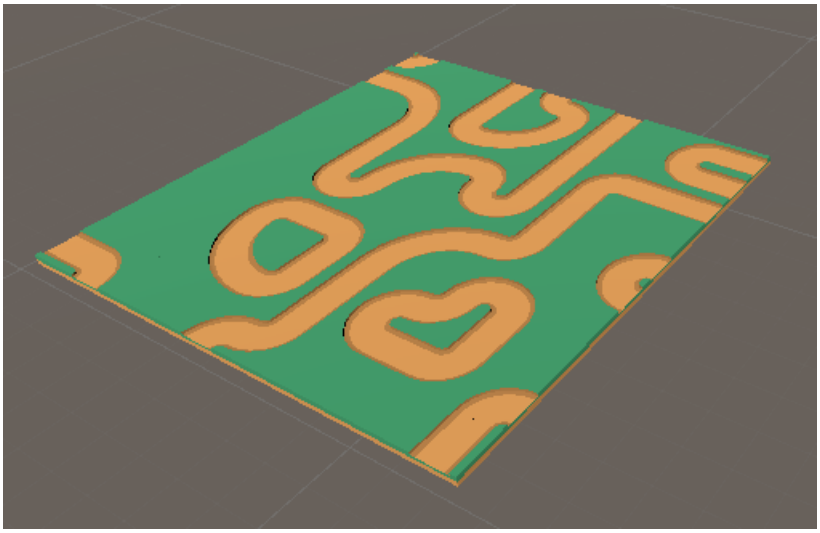
Add 3 extra cubes to the tile to cover it. This tile will now take up as much space as 4 regular tiles.



Paint the sides of the new tile green and brown, like the original tiles, to indicate how it connects.



Now we're ready to add this cube to the list of tiles in the generator, and hit Generate. The new tile will be seamlessly mixed with the smaller tiles.



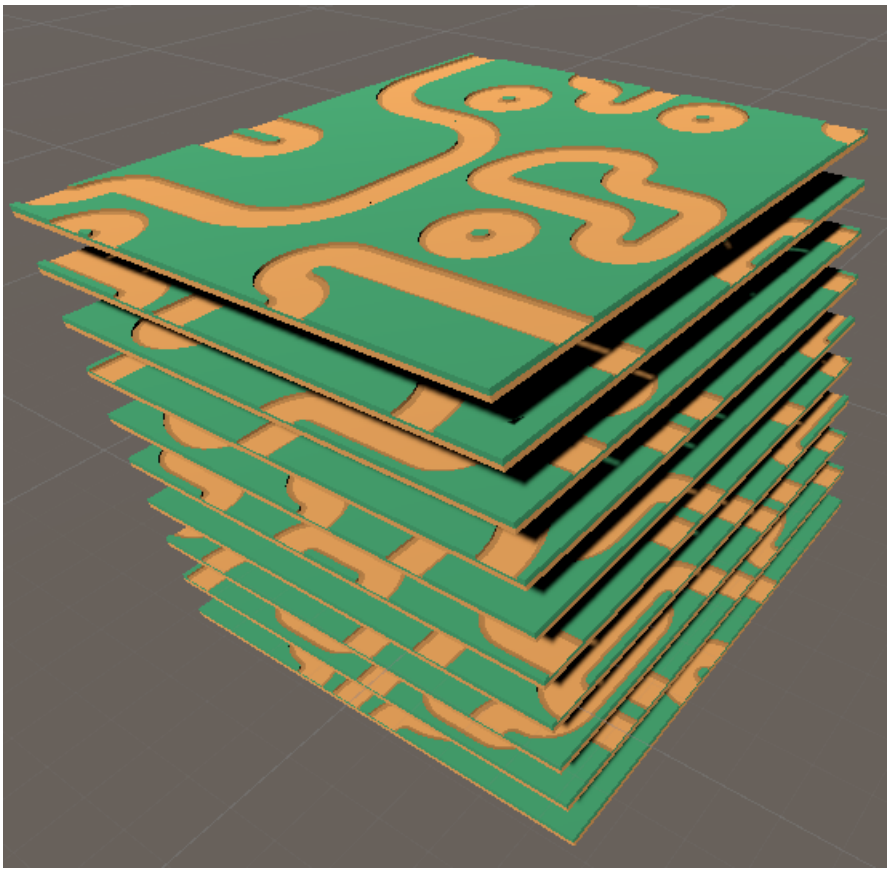
# Generating 3d layouts Tutorial

*This tutorial continues from the Big Tiles tutorial. It is recommended you complete that one before starting this.*

## Earth and air

So far we've only generated a single layer of tiles. But Tessera can work with 3d grids too. The principle is exactly the same - paint tiles to indicate how they connect and let Tessera do the rest.

Let's turn our previous example into a 3d example. First, go to the generator, and find the size setting and increase the Y size to 10. Now if we hit generate, we get something like the following:



There's two things to note:

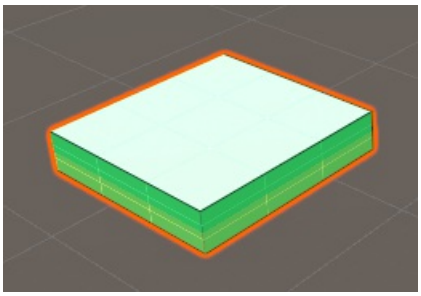
- Each layer is separated from the one above by 1 unit, even though our tiles aren't nearly that high.
- Just like in the first tutorial, Tessera doesn't know how things connect. We need to paint the tiles to indicate what can be put on top of what.

Let's fix those issues.

First, change the Tile Size property in the generator to (1, 0.2, 1). This is the size of the meshes we are using. Now do the same thing for the tiles. They should also have their center Y set to 0.1. All new tiles will want to share these same settings.

Second, let's paint tops and bottoms of the tiles. Paint the top faces of each tile as white, and the bottom ones as black. This will indicate above ground / below ground respectively.

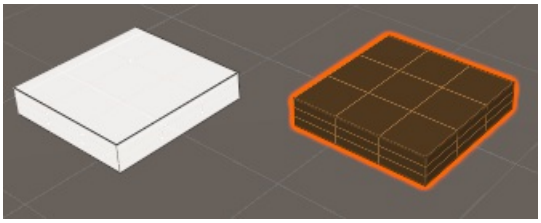
*NB: You can use "Show Backfaces" to easily see the far sides of cubes so you don't need rotate all the time to paint everything.*



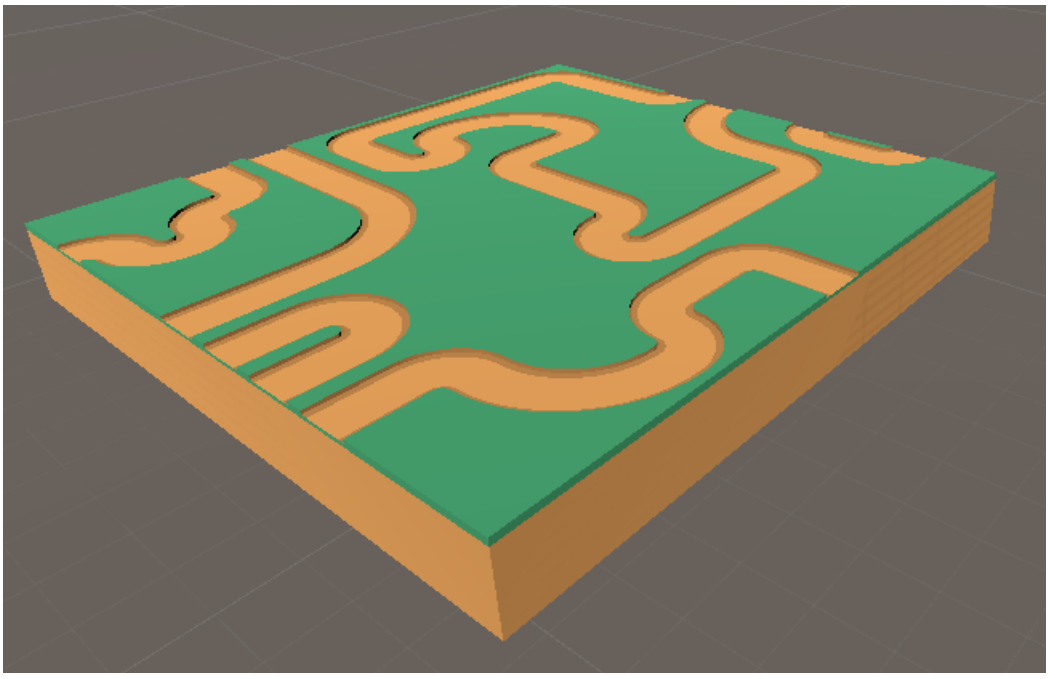
If we run the generation now, it will fail.


This is because we've colored the tiles so that they no longer stack, but we haven't provided anything to stack above or below them. Tessera tries to fill the *entire* generator bounds with tiles, and fails if it cannot do so. So we need some more tiles.

Create an empty called `tile_air` and from the assets load `tile_dirtHigh`. Give both of these the TesseraTile component, add them to the Generator's tile list, and set their Tile Size and Center as with the other tiles. Now paint them. `tile_air` should have all 6 faces painted white, and `tile_dirtHigh` should have all 6 faces painted black.



Now generation should be working again, and you'll get a 3d, if flat, landscape.

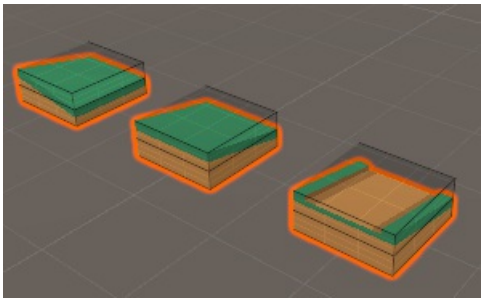


*NB: You may notice that instantiating this many tiles takes quite a bit of time. This can be undesirable for a game. If you select the air and dirt tile, and enable "Instantiate Children Only" then they will no longer be instantiated (as they have no children), speeding things up considerably.*

## Adding slopes

We need to add even more tiles before the surface can crinkle. Let's take 3 more from the tower defense assets: `tile_slope`, `tile_cornerOuter` and `tile_straightHill`. Again, TesseraTile component, Tile Size (1, 0.2, 1), Center (0, 0.1, 0).

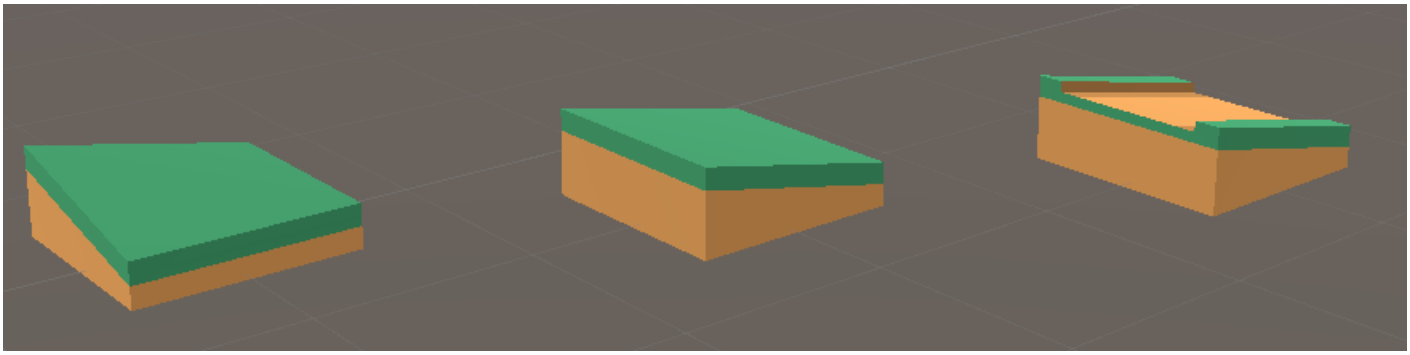
You'll notice that the tile meshes poke out the top of the paint cube. Use Add Cube to stack a second cube on top of the first so that the meshes are completely contained within. See the big tiles tutorial for details.



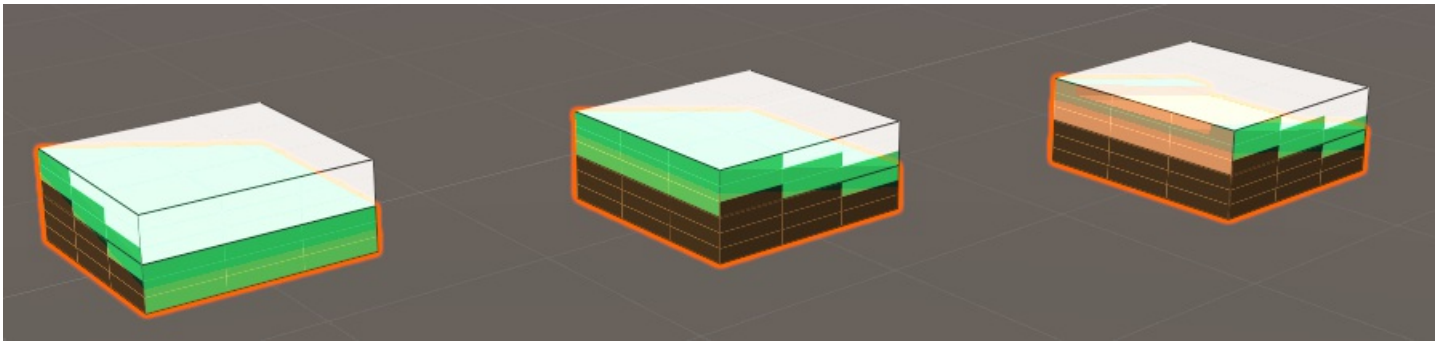
Now, we need to paint the cubes. We need to careful when painting them. We want to ensure that all our existing tiles connect to these new tiles at the correct places. And we need to make sure that the sloped sides can connect only to each other.

Rather than give the sloped sides an extra color, we will paint them with a recognizable pattern. That will serve as a reminder. Sometimes we'll paint the pattern, and sometimes the reflection, indicating which direction the slope is running. Tessera will recognize this, and connect them appropriately. You can use the "Pencil" tool  to paint patterns.

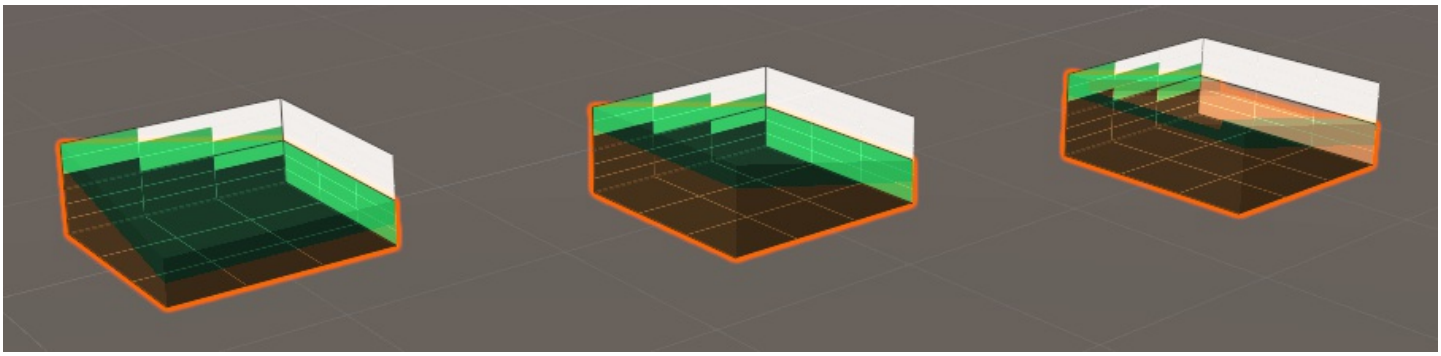
Paint the tiles. Before:



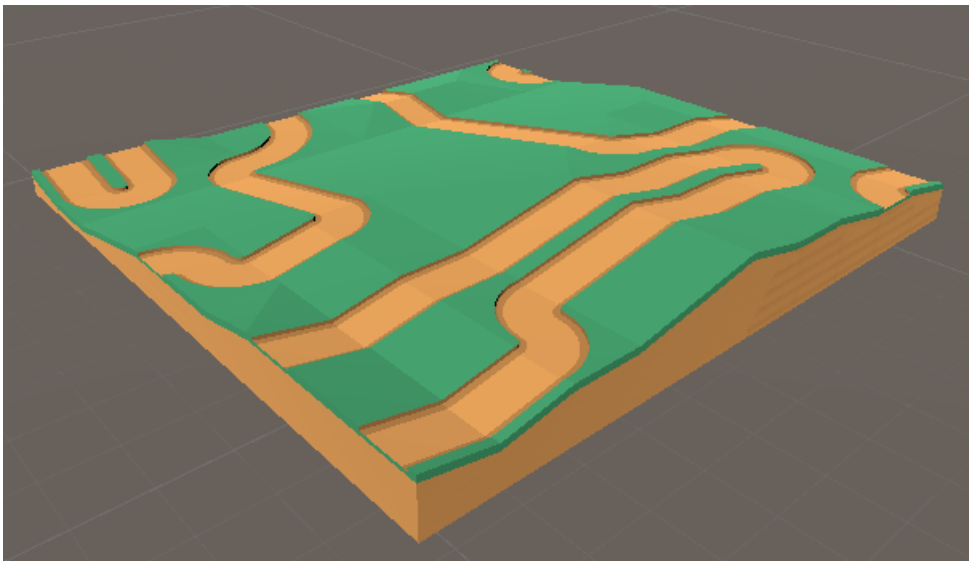
After painting:



After painting, showing backfaces:



Add the new tiles to the generator, and you should be rewarded with a undulating landscape:



## Adding a sky box

You may have noticed that sometimes the generator fills the entire volume with nothing but dirt, or nothing but air. There's nothing in what we've generated so far that prevents that. The generation algorithm will often suprise you out like that - anything that is a legal arrangement will occasionally be generated, and legal arrangements aren't always what you intended. One easy fix for this is adding a skybox to the generator. A skybox constrains what tiles can be placed on the boundary of the generated volume.

In this case, we want to force the top of the area to be air, and the bottom to be dirt, and we don't care about the sides. That will force there to be a surface somewhere between the top and bottom. Create an empty with the TesseraTile component, and paint the top face white and the bottom face black. Then assign it to the Skybox property of the generator. This will fix things as desired.

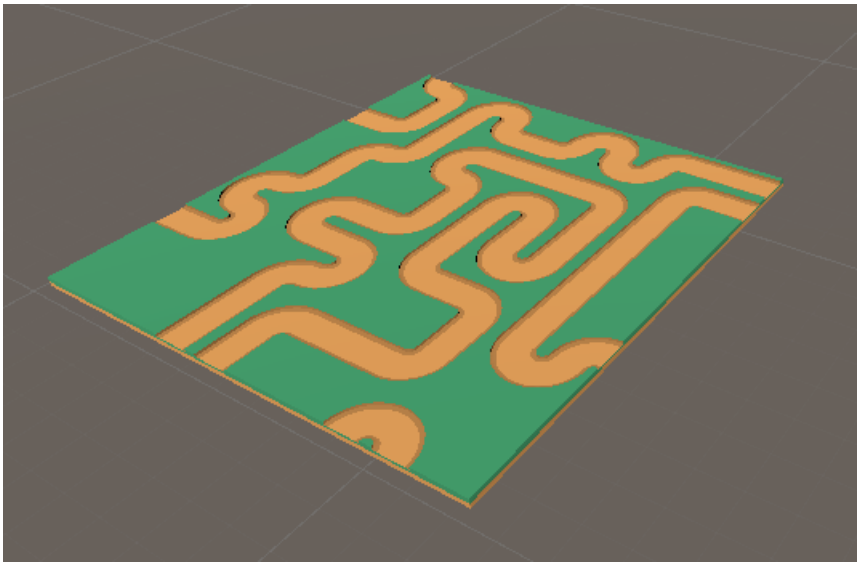
# Path Constraints Tutorial

*This tutorial continues from the Getting Started tutorial. It is recommended you complete that one before starting this.*

Note

Path constraints are only available in Tessera Pro

So far we succeeded in generating a level composed of grass and path tiles:



However, for many purposes, a level like the above is not acceptable. If the player is only able to walk along the path, then it's not possible for the player to walk over all the path tiles of the map, there is simply no route between them.

So far, all our generation has been *local* - that is, we've controlled what tiles are placed next to each other, without any regard for the overall structure. Now we are going to use the PathConstraint to assert some *global* behaviour on the map. The path constraint can be used in various ways, this is only an introduction.

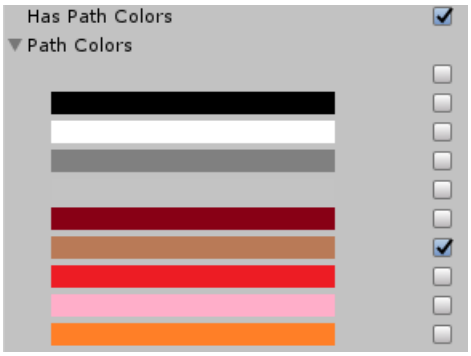
# Setup

First select the generator object. Enable the `backtrack` option. Backtracking makes the generator try harder to find a viable solution. It's necessary when using the path constraint as the generator can otherwise get stuck trying to find a valid path.


Next, add a `Path Constraint` component to the generator. We need to configure the constraint, by telling it what we consider a path.

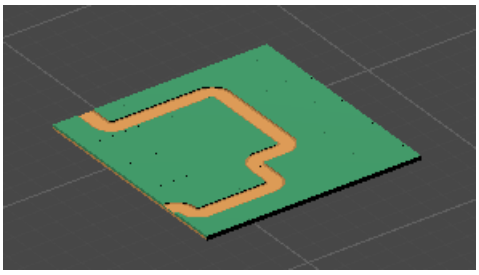
Recall that we colored the tile edge green if that edge was grassy, and brown if that edge had a path. We can give that information to the constraint.

Check the "Has Path Colors" checkbox, and then check the color corresponding to the path.



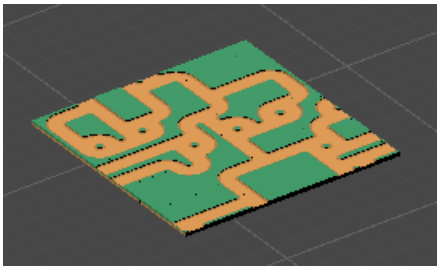
This tells the generator to search for all the sides of tiles that have that color in the center. If two such sides connect together, then it considers there is a path between those two tiles. The constaint then ensures that all path tiles connect to each other.

If we run the generator now, it'll only ever generate a single path:



# Getting fancier

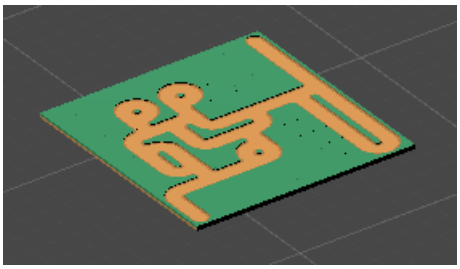
Let's add the `tile_split` tile to the generator, as you can get a lot more interesting paths once you allow junctions. The constraint will still ensure that it's always possible to walk accross the map.

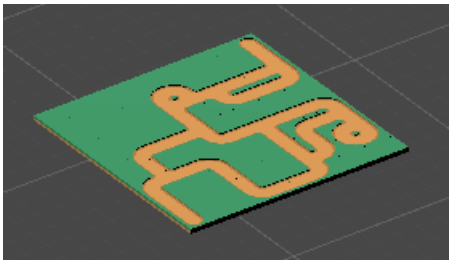


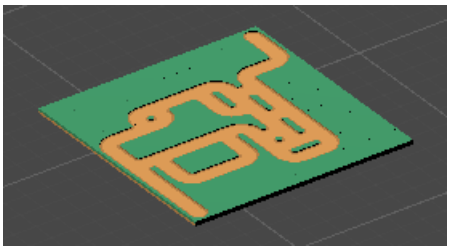
Add a `tile_endRound` to opposite corners of the generated area as a pinned tile. Because these tiles are also painted with the brown path color, they are considered part of the path. And because they are pre-placed, it forces the constraint to make sure both are connected.

A few last tweaks: Set the skybox to the `tile` object to stop the path going off the edge of the map. And set the weight of the `tile` object to 10, increasing the ratio of grass tiles to path tiles.

Now we have a generator that makes self-contained full navigable maps. Here's a few results.







# Generating on Mesh Surfaces Tutorial

*This tutorial continues from the Getting Started tutorial. It is recommended you complete that one before starting this.*

Note

Generating on Mesh Surfaces is only available in Tessera Pro

By default, Tessera generates tiles in a regular grid - every cell is the same and shape, and placed in the same relation to each other.

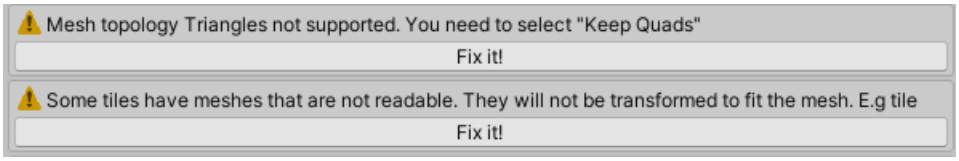
Surface mesh generation allows you to ignore this entirely. Instead, each tile will be placed in a cell corresponding to the face of a given mesh.

That means each cell will have a different shape, and the adjacency connections between cells are determined by the edges of the mesh. The local y-axis used when designing the tile will get rotated to match the normal of the face, and similarly the local x and z axes will point tangent to the face.

Let's make a micro-planet as an example.

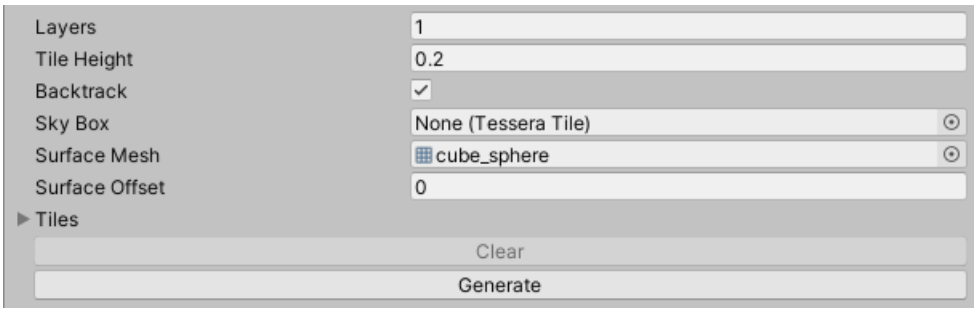
Start with the generator created in the previous tutorials and find the `Surface Mesh` property in the inspector. Click the  icon and select `cube_sphere`, a mesh that comes in the Samples folder of Tessera Pro. You can use any quad mesh (i.e. all the faces have exactly 4 edges).

Depending on which assets you use, you may see the following warnings:

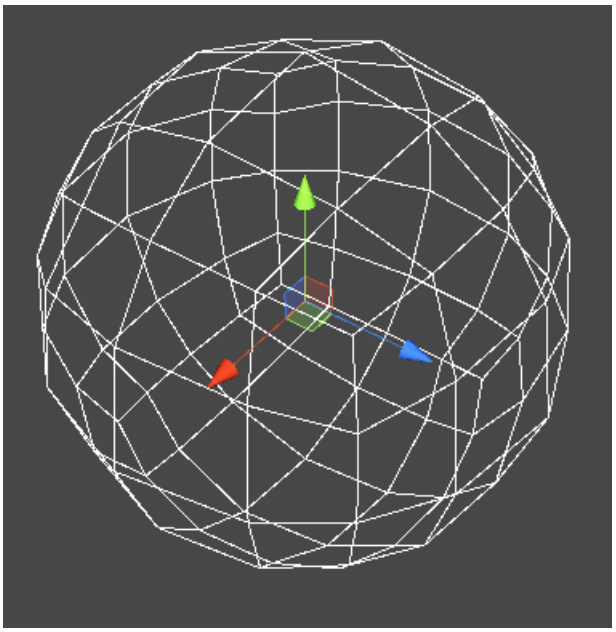



The surface mesh feature requires certain import settings to be configured. Press the fix it buttons will automatically change the assets as needed.

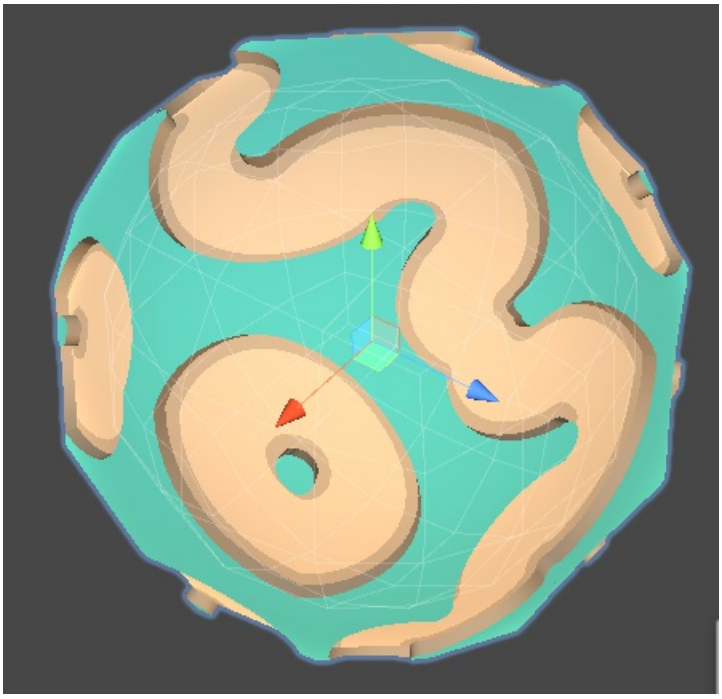
After setting a mesh, the inspector UI will have changed a little:




If you enable gizmos, you should be able to see a wire mesh.

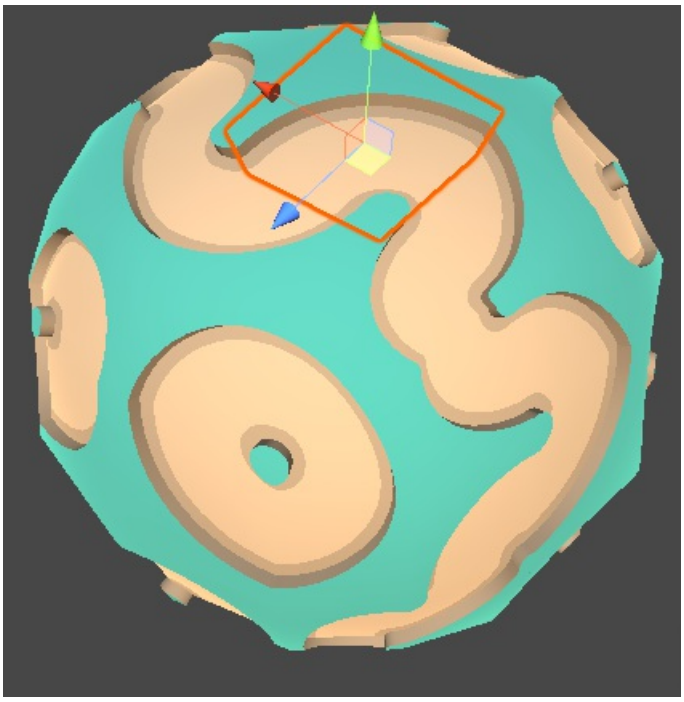


That's pretty much it. Hit generate, and see the results.



As you can see, one tile has been generated for each face of the mesh. Further, Tessera has transformed any meshes associated with the tile to make them fit the face. That gives us a totally seamless result with non square tiles, even though all the designed tiles were square.

Tessera will transform meshes found in MeshFilters, MeshColliders and BoxColliders. It'll also modify the position, rotation and scale, so the created GameObjects interact most compatibily with the other features of the game.



## Caveats

A few features do not work with meshes:

- You cannout use Tilemap Output as Unity Tilemaps expect a regular grid of tiles.
- The mirror constraint is not supported.

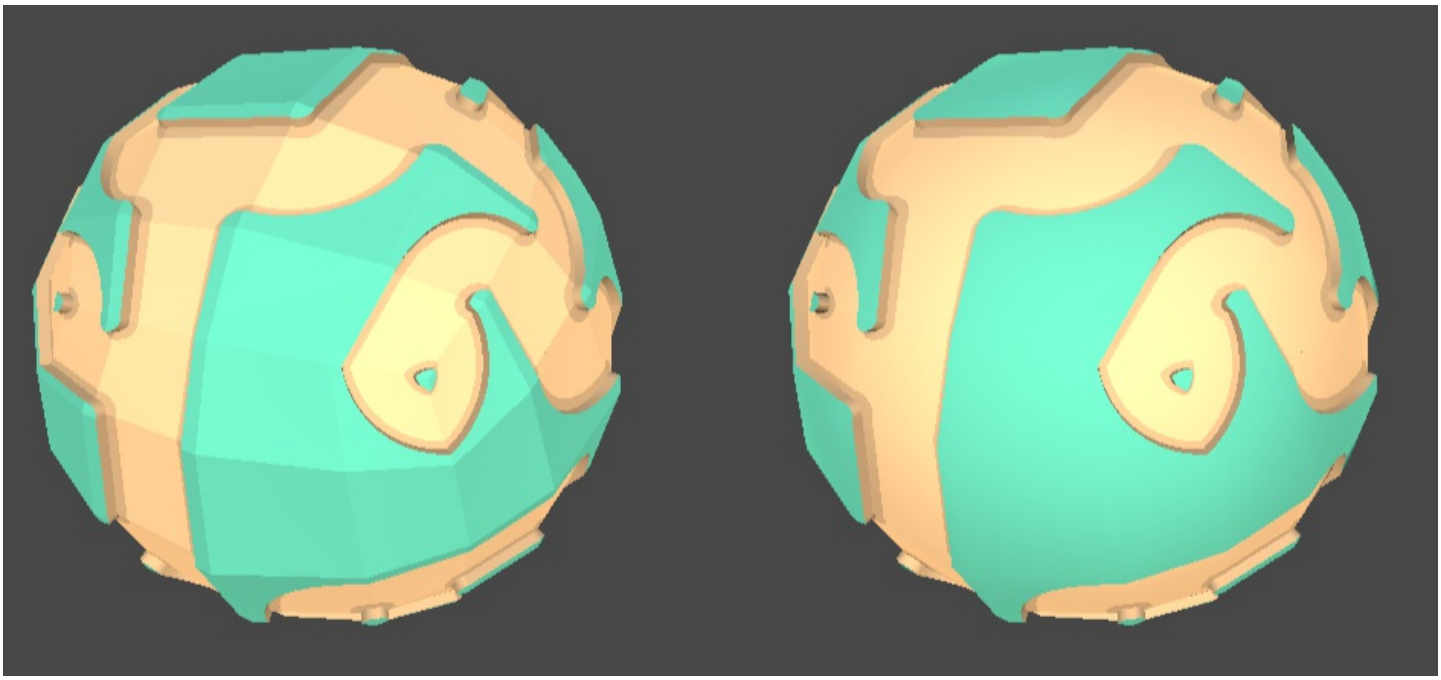
When pressing the Generate button in the Editor, it is not possible to undo the action as Unity can get extremely slow serializing all the transformed meshes.

The mesh distortion pushes around vertices, but never adds any. You may need to add extra vertices to your tile models so that adjacent tiles still line up after distortion.

You are recommended to use tiles with Reflectable and Rotatable enabled. It still works when they are turned off, but it can be hard to control the direction of each cells local x-axis. It is determined by the order of vertices in the face of the mesh, and most editor programs do not let you easily manipulate this.

## Smooth normals

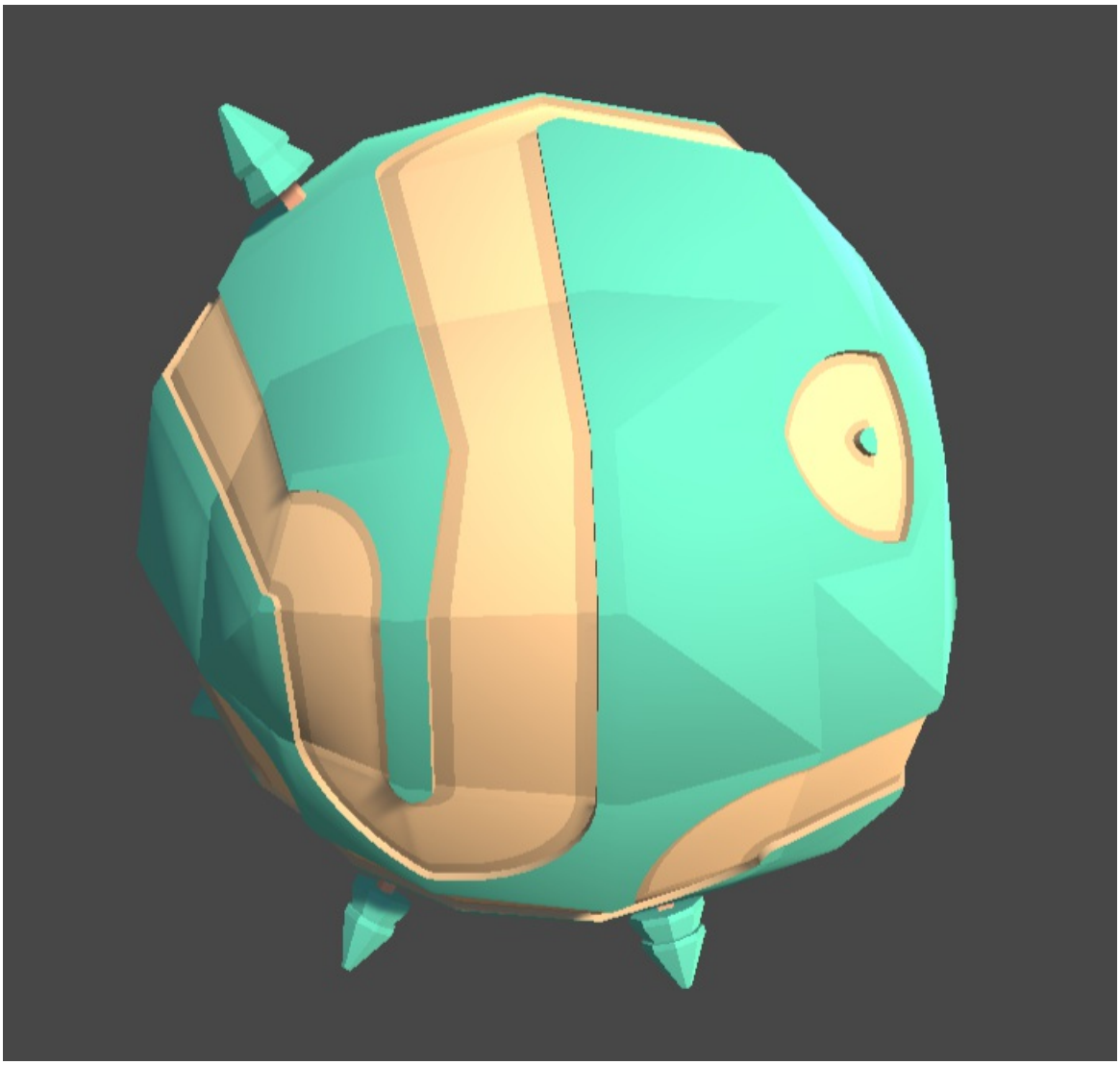
You can figured if normals should be smoothed between adjacent faces of the mesh. For smoothing to work, the surface mesh must have UVs configured.



## Multiple layers

Just as regular generators support a 3d layout of tiles, so does generating on a mesh surface. By setting the Layers property (or `size.y` in the API) to a value larger than one, you will stack multiple copies of the mesh surface above one another. Each layer is an expansion of the mesh along the vertex normals by the amount given in Tile Height (or `tileSize.y` in the API).

If you've set up your generator with the 3d tiles and skybox described in the 3d tutorial, then you can get results like the following on `cube_sphere`.



## Submeshes

If you are Mesh object you've selected for the surface has multiple submeshes, (i.e. multiple material slots), then you can filter which tiles are appropriate for which part of the submesh, similar to volumes, above.

The Generator inspector will automatically detect this case. Simply turn on "Filter By Submesh" and then select which tiles appear where.


Tessera Pro comes with a City example that demonstrates this.

# Triangle grids

The above tutorial demonstrated using cube tiles on a quad mesh. But if you use triangle tiles you can instead use triangle meshes.

# Constraints

The basic configuration of a generator involves setting up tiles, and painting those tiles to show how they can be placed next to each other.

This page documents further configuration you can do to tightly control the generation process.

There are many constraints available in Tessera:

- Initial Constraints
  - Pins fix a particular tile in place
  - Volume constraints filter a particular area to a subset of tiles
  - Skyboxes controls how tiles on the boundary of the generation work
  - Submesh filters applies permaterial settings when working with surface meshes.
- Generator Constraints
  - CountConstraint - ensures the number of tiles in a given set is less than / more than a given number.
  - MirrorConstraint - ensures the output remains symmetric.
  - PathConstraint - ensures that there is a connected path between tiles, where you define which tiles connect to each other.
  - SeparationConstraint - ensures that the given tiles are spaced at least a certain distance apart

## Initial Constraints

Initial constraints configue the intial conditions of the generator. They generally set up by adding behaviours into the world.

- Pins fix a particular tile in place
- Volume constraints filter a particular area to a subset of tiles
- Skyboxes controls how tiles on the boundary of the generation work
- Submesh filters applies permaterial settings when working with surface meshes.

### Pins

Sometimes you just want to place a tile at a particular location without Tessera doing for you. For example, you might want to place a entrace manually at one side, or write custom code to draw path ways for you. Pinned tiles lets you do this, and then have Tessera generate the rest of the tiles for you.

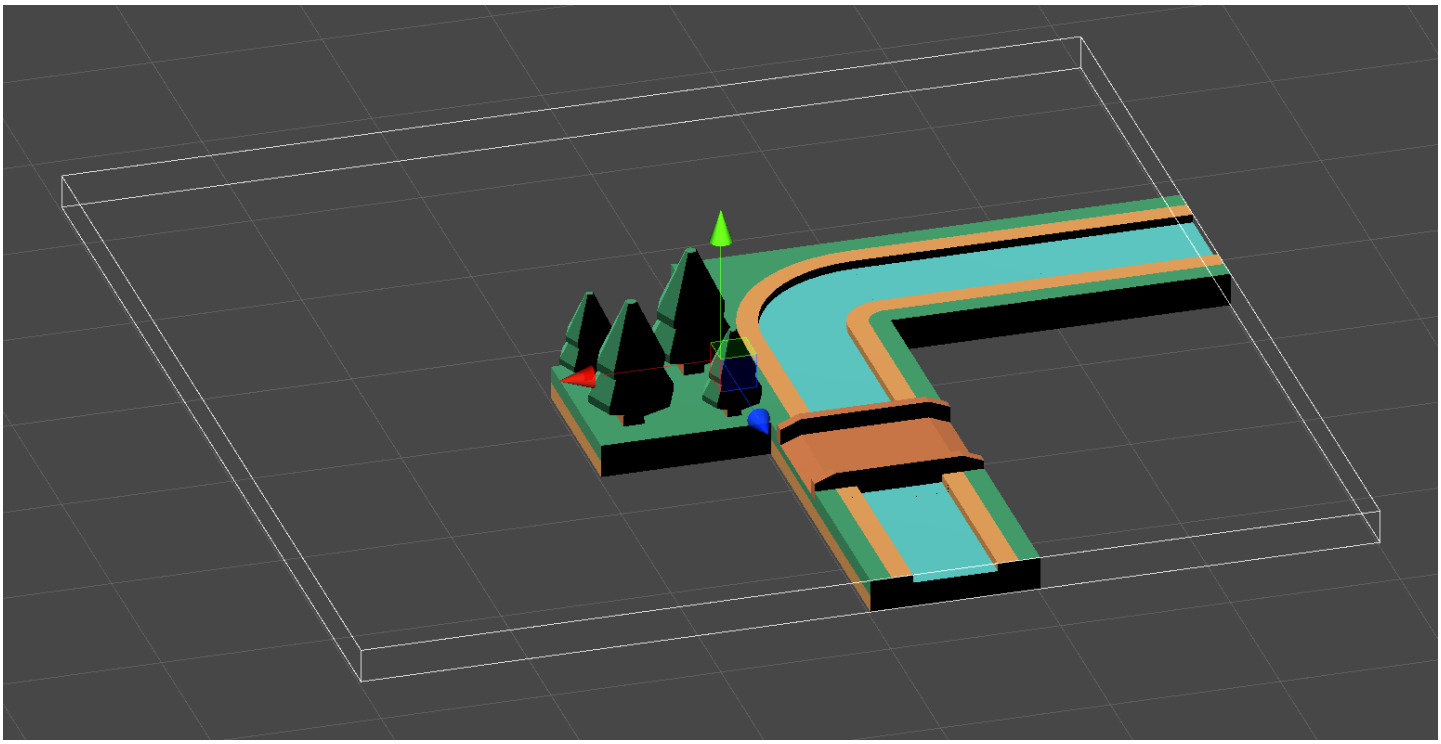
There's multiple ways to specify pins - all of them involve putting a game object inside or adjacent to the generator area, in the position of the cell you want to affect. They will be automatically detected and incorporated into the generation.

The most flexible way is to great a game object with the TesseraPinned component. You can then specify the PinType and the tile to pin as properties of that component.

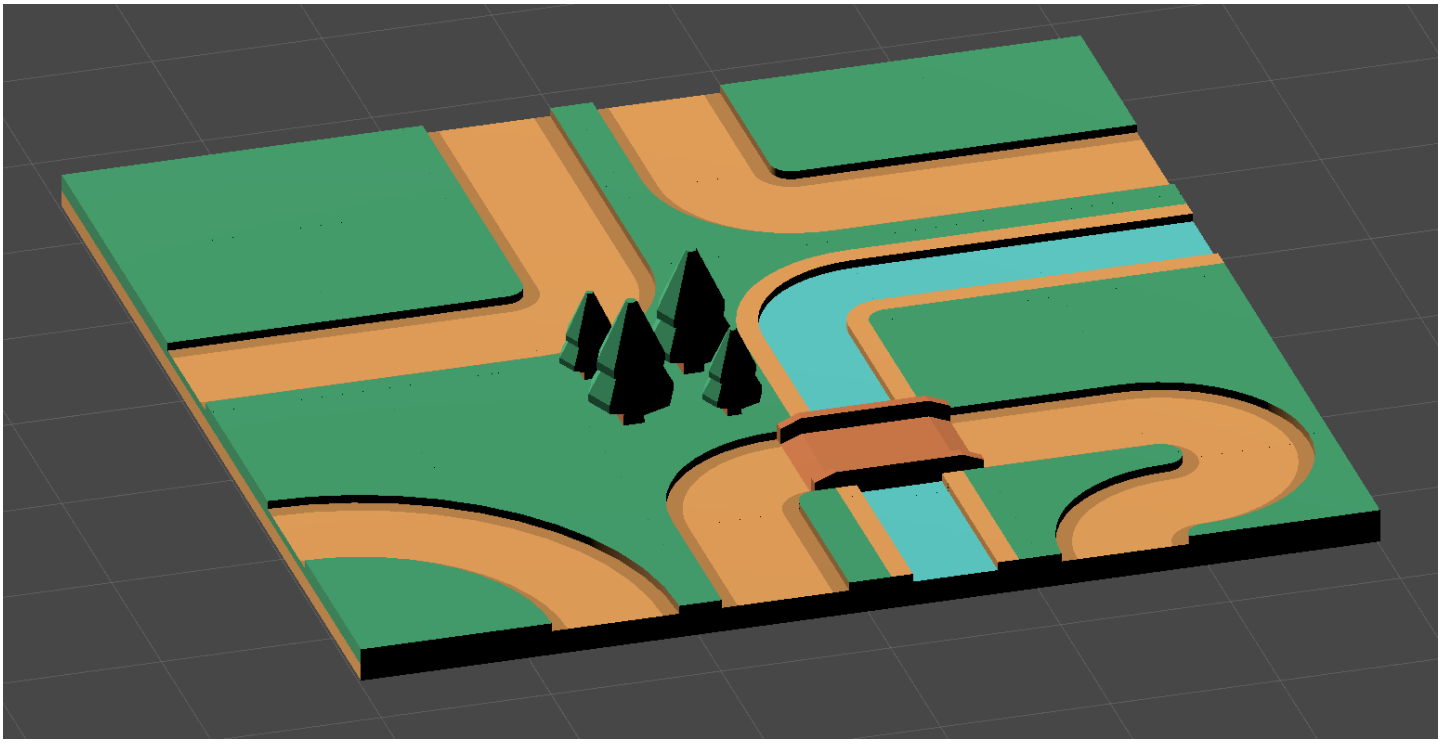
As a convenient short cut, you can also just place a Tessera tile directly. These will be interpreted the same as a TesseraPinned component that references that tile, and has pin type FacesAndInterior.

You can also place an object with both a Tessera tile component and a TesseraPinned component. The TesseraPinned will be assumed to reference the tile component on the same game object.

Here is an example. A generator is set up and a few tiles manually placed.



When the generator is run, the new tiles join up with the placed tiles.



### Configuring pins

TesseraPinned has two key properties:

- **Tile** determines what tile to use for pinning.
- **PinType** controls how exactly the pinned tile effeects generation.

These two values are inferred in some cases, as described above.

There are three types of pin:

#### PinType.Pin

With this pin type, the generator is forced to generate the referenced tile at the location of the pin.

The referenced tile must already be in the generator's tile list (though it can have weight 0).

#### PinType.FacesOnly

With this pin type, the faces of the referenced tile are used to constrain the cells adjacent to the location of the pin, and the generator is free to pick any tile for that cell.

#### PinType.FacesAndInterior

With this pin type, the faces of the referenced tile are used to constrain the cells adjacent to the location of the pin. Also the cells covered by the pin are masked out so no tiles will be generated in that location. You may therefore need to manually place a tile or other game object to fill the gap. Unlike PinType.Pin, the refenced tile *does not* need to be in the generator's tile list.

The different pin types can be used to generate a variety of effects. FacesOnly, for example, is good at restricting the generation along a given plane, without forcing any particular tile. FacesAndInterior allows you to put in custom tiles (often called "hero" pieces) that never otherwise appear in generation. And Pin is good for forcing a particular tile to be placed, while still allowing that cell to be part of generation. That can be important if you need the cell to interact with generator constraints or other Tessera features.

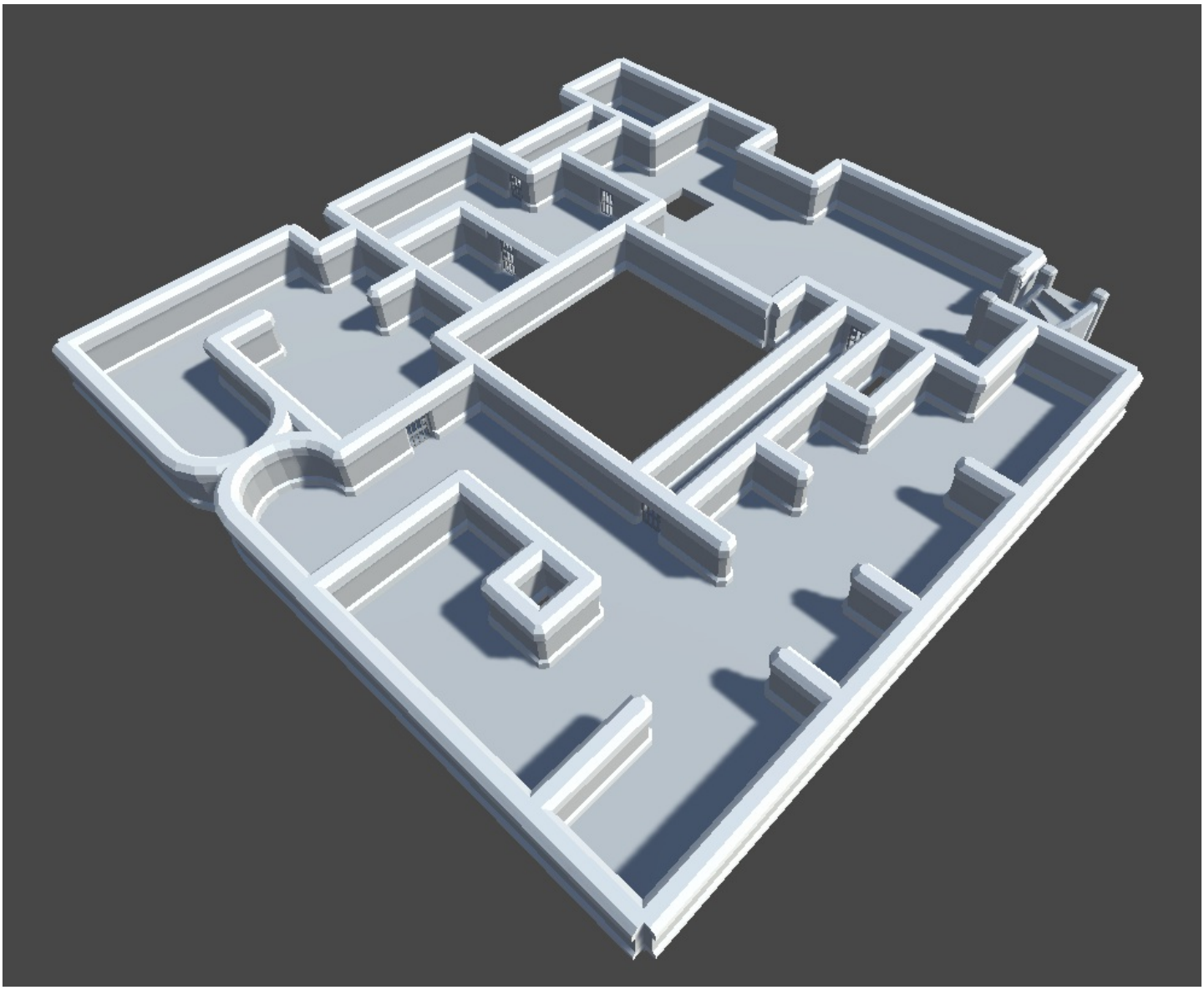
### Volumes

Add a GameObject with the Tessera Volume component to filter an area of cells to only use a subset of tiles.

To use it, add a game object with the volume component, and set the cells you want to filter to. You can optionally specify a generator for convenience, but it's not necessary.

Next add colliders to the game object to define the area selected. A cell is in the volume if its center is inside at least one collder.

Here's a dungeon generated with a box collider volume in the center, configured to filter to just an empty tile.



Unlike pins, volumes have no way to configure the rotation and reflection of the generated tile.

Volumes can also be used to remove tiles from the generator entirely, by setting the volume type to MaskOut. This behaves similarly to pinning tiles with FacesAndInterior - the missing cells interact differently with constraint.

### API

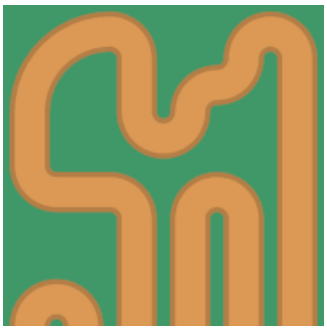
The default behaviour of generators is to search the scene for appropriate pins and volumes. This can be slow for large scenes, and it's not suitable for advanced customization. You can use the C# API to set pins and volumes directly.

First, disable the automatic detection by setting searchInitialConstraints to false. Then you can supply your own initial constraints by setting initialConstraints. You need to call GetInitialConstraintBuilder to get a utility to convert various objects to initial constraints.

### Skybox

Setting the skybox property of the generator will automatically constrain all tiles on the boundary of the tile area. The skybox should be a TesseraTile component. Whatever is painted on the top of the skybox, will constrain the top of every tile on the topmost layer of the generator. Similarly for the other sides of the cube.

In this example, the skybox has been used to force the bottom edge to be all paths, and the other edges to have no paths.



### Notes

The tile used for a skybox should not be a big tile, this will cause wierd behaviour.

If a pinned tile constraint and the skybox both apply at a particular location, the tile constraint takes precedence.

Note that a given skybox face is repeated as a constraint for *all* tiles which have a corresponding face on the boundary. This can sometimes cause counter-intuitive results. For example, if you have a 3d example like in this tutoral, then you cannot have a skybox that is "grass" on the sides. Doing so allows surface tiles, but would stop air and solid tiles from touching the boundary, which will cause the boundary to fail.

The solution to this is to make a new palette color just for the skybox. You can then set that color connect with *multiple* other colors, so that it's possible to place all the tiles that can abut the boundary.

### Submesh filters

Note

Submesh filters are only available in Tessera Pro

If you are generating on a mesh surface, and that mesh has multiple submeshes, (i.e. multiple material slots), then you can filter which tiles are appropriate for which part of the submesh, similar to volumes, above.

The Generator inspector will automatically detect this case. Simply turn on "Filter By Submesh" and then select which tiles appear where.


## Generator Constraints

Note

Generator constraints are only available in Tessera Pro

These constraints control the *global* behaviour of generation. They are very powerful, but can use generation to fail more

frequently.

To use them, find the game object that has the generator, and add additional components to it from the `Component > Tessera` menu.

At present the constraints are:

- CountConstraint - ensures the number of tiles in a given set is less than / more than a given number.
- MirrorConstraint - ensures the output remains symmetric.
- PathConstraint - ensures that there is a connected path between tiles, where you define which tiles connect to each other.
- SeparationConstraint - ensures that the given tiles are spaced at least a certain distance apart

There is a tutorial on how to use path constraints.

# Count Constraint

The CountConstraint is a generator constraint that counts the number of tiles in a given set that are generated and ensures that the total in the final output is above/below a given number.

## Eager

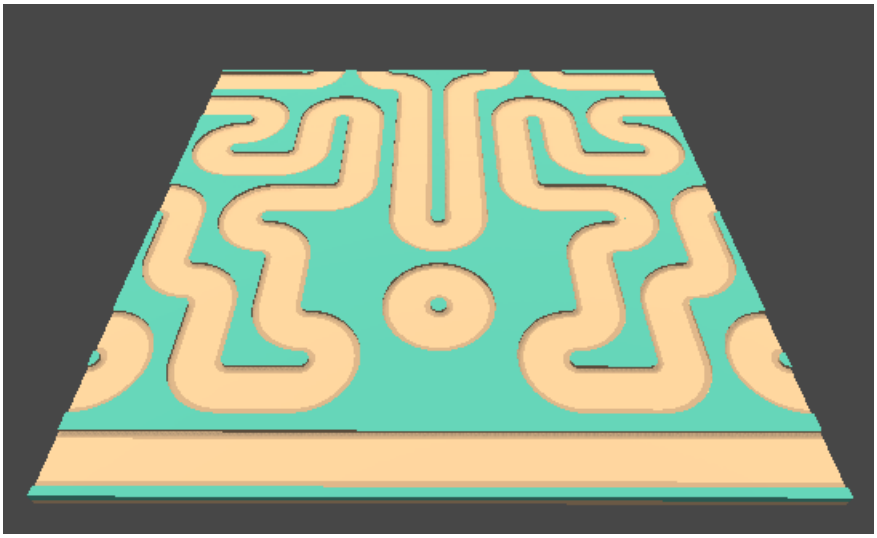
Normally, this constraint is run while generation occurs. I.e. it'll count the tiles as generation occurs, and take action once the limit has been reached. This strategy generally works well, however in some cases it'll cause problems.

1. If a tile has a very high weight, but a low limit in the Count Constraint, then the limit will be reached early and the rest of the generation will have none of those tiles.
2. If the tile is very hard to place, and you've required at least a certain number of them, then the Count Constraint can wait too late before forcing placement, so the generation never succeeds.

These issues can be avoided by setting the constraint as "eager". When eager, it'll place the counted tiles first, before attempting to place any others, ensuring an even distribution, and priority positioning.

# Mirror Constraint

The MirrorConstraint is a generator constraint that ensures that the generated output is symmetric about a given axis.



You can select one axis, X, Y or Z. If you want symmetry about 2 axes, use two copies of this constraint.

The mirror constraint is unlikely to work very well unless you enable `reflectable` on your tiles.

If you have initial constraint tiles, then the empty cell that mirrors that is ignored by the mirror constraint.

## Odd vs evens

If the tile generator is an odd number of cells wide, then the center line reflects onto itself. All tiles placed on the center line must therefore be symmetric themselves. If the width is even, then there is less restriction as tiles on one side of the center line just have to connect to their own reflection.

## Specifying tile symmetry

By default, the constraint looks at the painted sides of each tile, and infers that the tile is symmetric in a given axis if the painted pattern is symmetric. It does not look at any other details of the tile. So, for example, if you had an asymmetric mesh, but with symmetric connectivity, you would need to override that.

To do so, enable "Override Symmetric Tiles" and check and uncheck which tiles should be considered symmetric. Marking a tile as symmetric means when it is placed in a cell, it'll also be placed in the mirrored cell, *with the same reflection and rotation*. Marking a tile as asymmetric means when it is placed in a cell, a mirrored copy of it will be placed in the mirrored cell. If the tile is marked as asymmetric and it does not have `reflectable` and `rotatble` set to enable that, then it cannot be placed at all.

Note that due to rotations, you may need to specify y and z symmetry even when reflecting on the x axis, and so on.

# Path Constraint

The PathConstraint is a generator constraint that forces there to be a connected path between all relevant generated tiles. See the tutorial for details on its usage.

# Separation Constraint

The SeparationConstraint is a generator constraint that forces a given set of tiles not to be placed too near each other. This can be useful to avoid things "clumping" too much, or as an alternative way of controlling the frequency of tiles, distinct from using a Count Constraint or setting the tile weight.

To use it, specify a tile or list of tiles to separate, and a distance. These tiles will never be placed within this many cells of each other. Distance is measured as individual steps from cell to cell (Manhattan distance), so on a square grid forms a diamond exclusion zone around each tile.

NB: Big tiles are not fully supported, and will always measure distances from one corner.

# Palettes

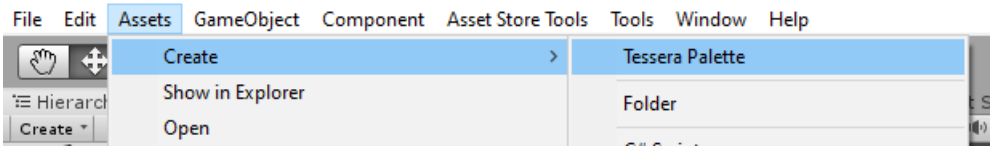
Palettes are an asset type for Tessera that lets you customize which colors you can paint onto tiles, and also controls how colors match.

By default, Tessera comes with a palette of 18 colors (plus transparent). Each color has a short name to help you identify it.

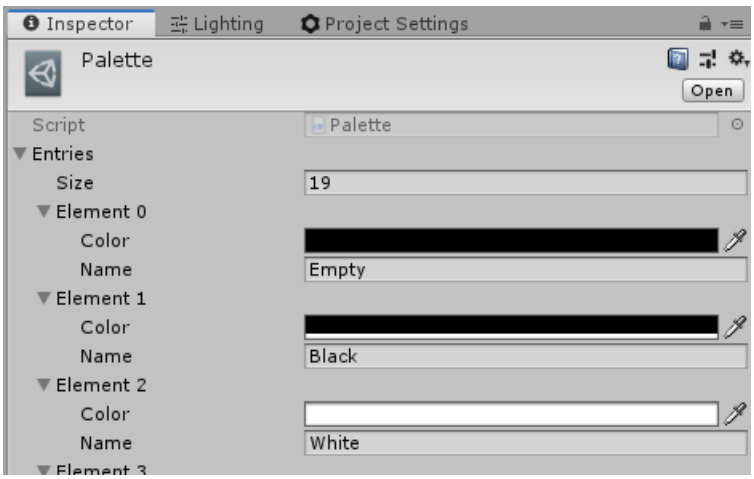
The default palette is configured so that two opposing squares "match" if the colors of those squares are the same, or one is transparent. Recall that two tiles can be placed next to each other if all 9 squares on the face of one tile match with the 9 squares of the opposing face.

## Creating a palette

To customize the palette, create a new Tessera Palette asset from the Assets menus.



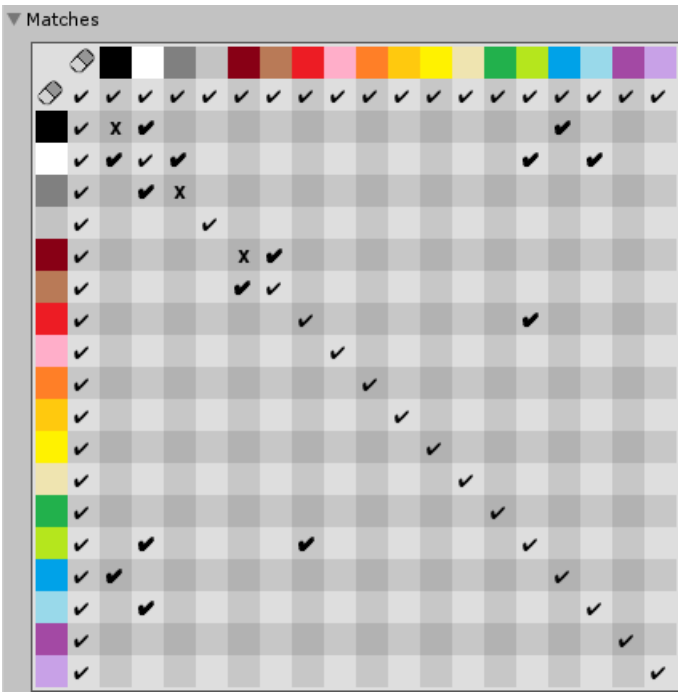

This will create a new asset in your project. You can then select the asset and customize the colors in the inspector.




To use the palette, select your tiles and assign the new asset to the palette field.

## Customizing the matching rules

Near the bottom of the inspector, you can see an grid of checkboxes.




You can click any cell to toggle if that pair of colors matches.

For example, in the image above, black does not match with itself, but does match with white. That means if we had a tile colored black, and another tiled colored white, the generator cannot place two black tiles adjacent to each other, but can otherwise intermix black and white.

If you open the platformer example, you can see an example of this in practise. E.g. walls (black) cannot directly face another wall, but can face onto air (white) or water (blue). I made a second wall color (grey), that works similarly, but lacks the water matching. That allows us to control exactly where water can be placed.

# Cell Types

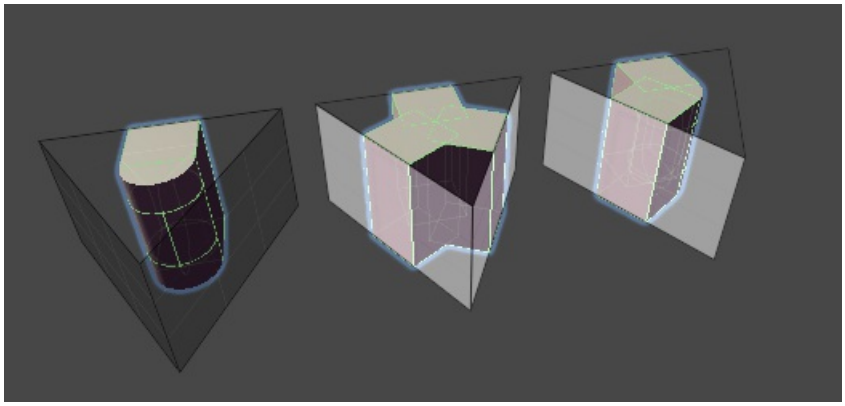
Note

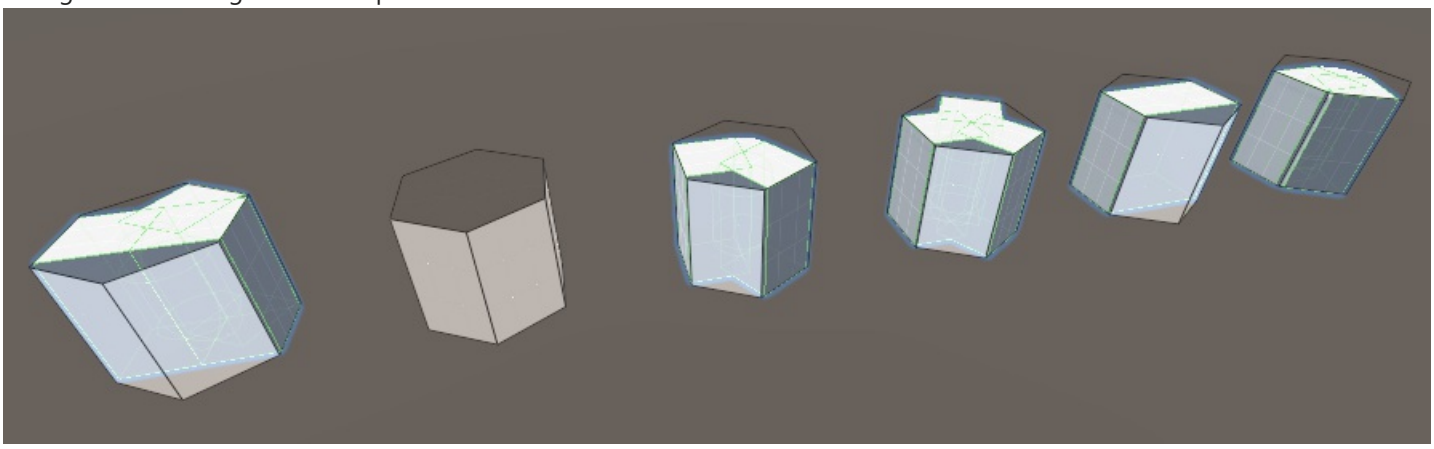
Cell types other than cubes are only available in Tessera Pro

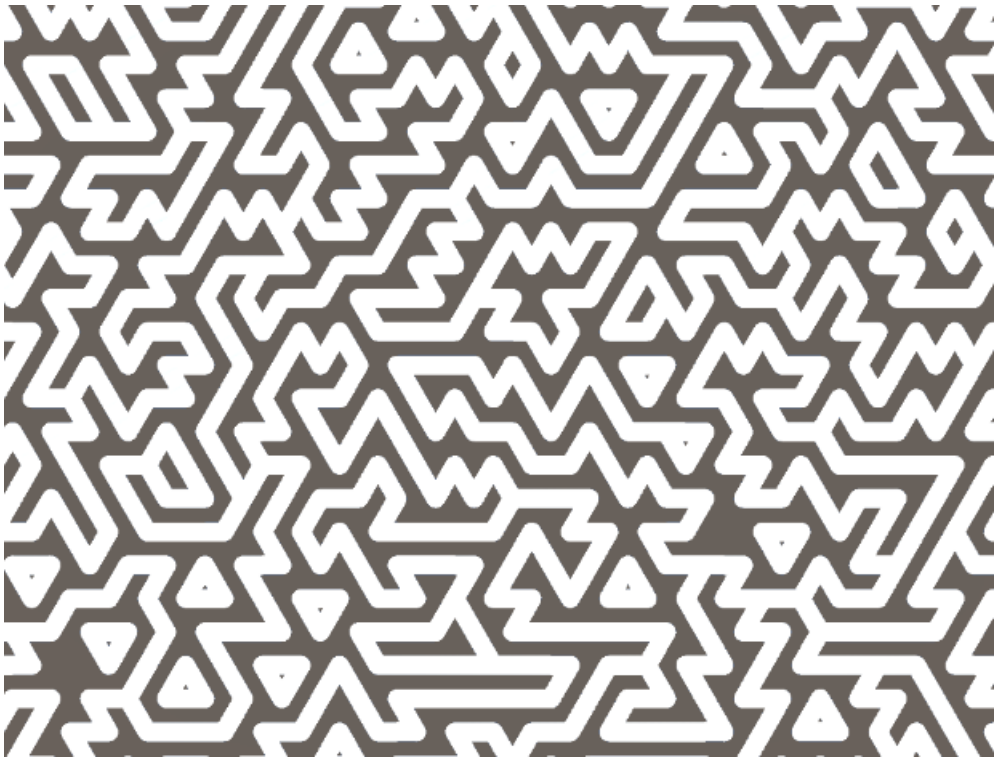
Tessera generally assumes you are working with square grids, however hexagonal and triangular grids are also supported.

To use this, simply use TesseraHexTile or TesseraTrianglePrismTile instead of TesseraTile.

As usual, you can paint the sides of the tiles, and the generator will automatically rotate and place the tiles into cells connecting the sides. Unlike cubes, hexagonal a triangular tiles can only be rotated in the XZ plane as they are less symmetric.

Trianglular and hexagonal tiles in paint mode: 





The result of running the generator.

## Caveats

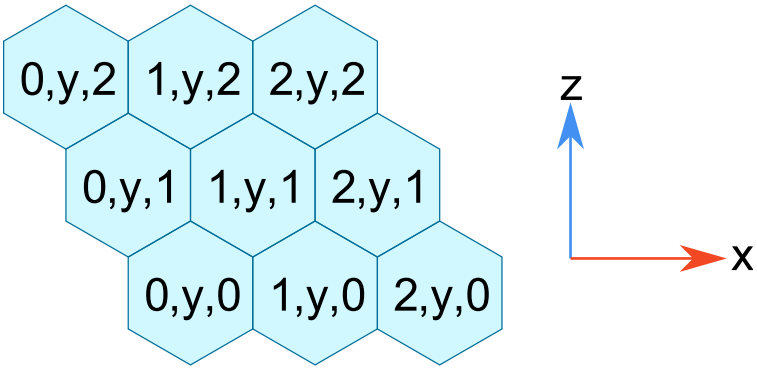
- Unlike cubes, hexes and triangles don't rotate nicely on all axes. So rotations are restricted to the XZ plane.
- Triangles generally need rotations enabled, otherwise you must make separate "points up" and "points down" tile variants.
- Different cell types cannot be mixed in a given generator.
- Mirror constraint not supported.

## Co-ordinates and measurements

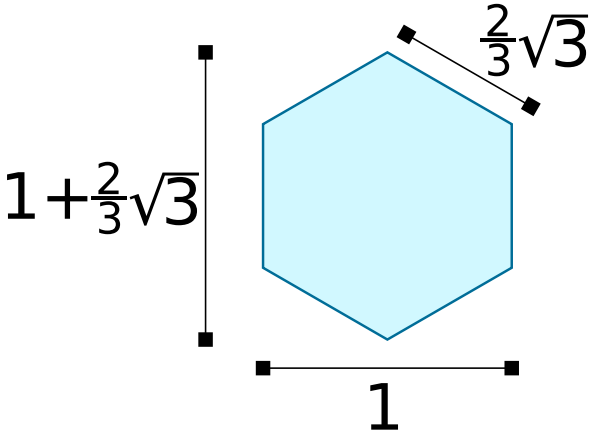
### Hexes

Hexes are laid out in the XZ plane. The Y-axis is used to stack hexes vertically. Hexes are pointy topped, not flat topped. If you need other axes or styles, simply rotate the generator appropriately.

Each hex is referred to using the following co-ordinate scheme:




For a hex of size one, you may find the following measurments helpful.

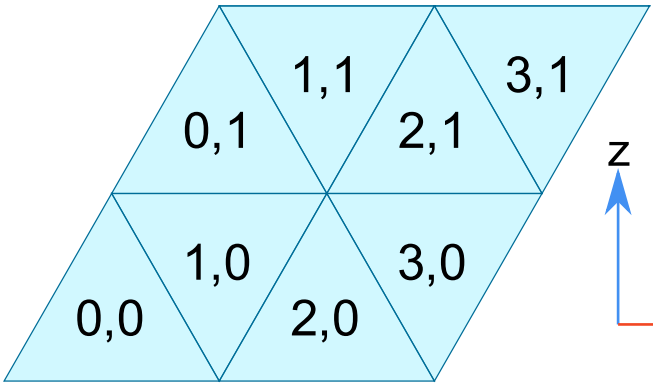



The distance between any two adjacent hex centers is 1.

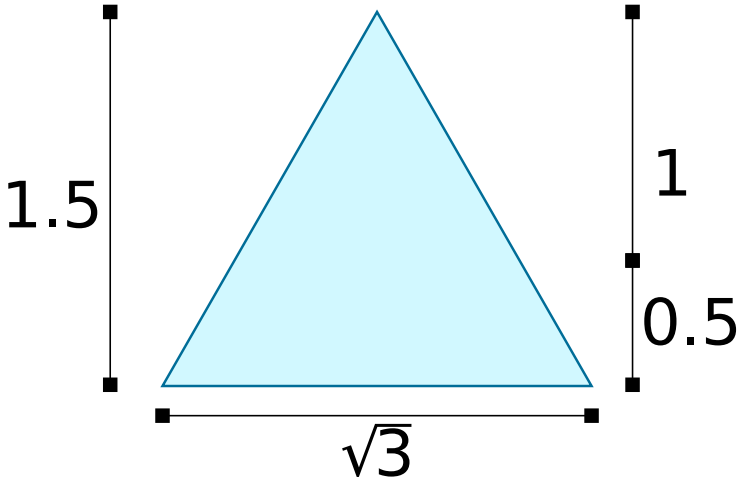
### Triangles

Triangles are laid out in the XZ plane. The Y-axis is used to stack triangles vertically. Triangles point up/down, not left right. If you need other axes or styles, simply rotate the generator appropriately.

Each triangle is referred to using the following co-ordinate scheme:




For a triangle of size one, you may find the following measurements helpful.




The distance between any two adjacent triangle centers is 1.

# Animation

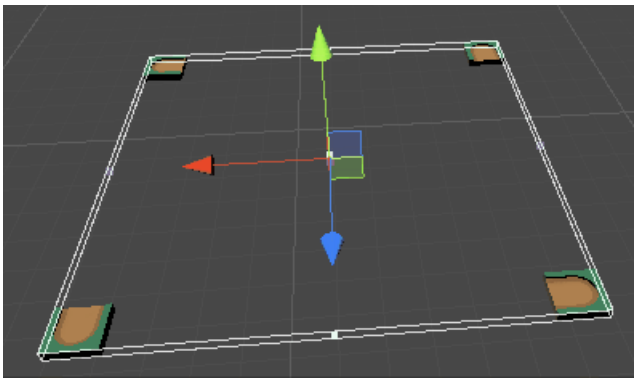
Note

This feature is only available in Tessera Pro

This feature is mostly for fun!

If you add the AnimatedGenerator to a generator, you can hit Start to run the normal generation process tile-by-tile instead of all at once. It works in both the Unity Editor and in-game.

This animation is much slower that generating all the tiles at once, but it looks cool, and it can show you where the generator is having difficulty. This can be handy if the generation takes too long, or keeps failing, due to not having the right sort of tiles.



`Seconds Per Step` indicates how long to pause between each step and `Progress Per Step` inidcates how many units of work to do in a step.

Each each unit of work is one of the following:

- Add a tile, and work out all other tiles that are implied by it.
- Backtrack once, done when the current configuration is impossible (if backtracking is enabled).

`Uncertainty Tile` should be a game object to use to indicate that Tessera is still thinking about a particular tile. The size of the tile indicates how many possibilities still remain.

# Controlling Output

Note

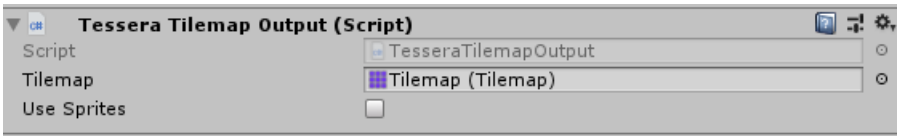
Output control is only available in Tessera Pro

By default, after doing generation, `TesseraGenerator` will instantiate copies of all the tiles as child objects. This is usually what you need, but it is possible to customize it further.

## Writing to a Tilemap

Unity comes with a Tilemap component that lets you store sprites and components in a regular grid.

To enable this, select the game object with the `TesseraGenerator` component, and add the TesseraTilemapOutput component. Then set the `Tilemap` property to the tilemap component. Then instead of instantiating objects, it will find the appropriate for cell fo the tilemap, and fill that in instead.




Note

You must ensure that the grid spacing of the Tilemap and of the generator are aligned.

Tessera comes with a sample called "Platformer" that demonstrates writing to Tilemaps.

If you check the `Use Sprites` property, then Tessera will attempt to detect game objects that contain a sprite, and write the sprite directly to the tilemap. This is considerably more efficient that inserting the entire game object into the tilemap, but you lose any other components.

## Writing to a Mesh

You can use TesseraMeshOutput to write directly to a mesh. Your tiles objects must have a MeshFilter and MeshRenderer, unless you check Instantiate Children Only, in which case this applies to the child objects of the tiles.

To use it, create an object with a MeshFilter and MeshRenderer. It doesn't need a mesh configured, but you should set the material(s) you want to use. Then add TesseraMeshOutput as a component to the generator, and set the target to the created object.

Tessera will automatically detect matching materials between the tiles and target object, and merge the meshes into submeshes to take advantage of it.

## Handling the output in code

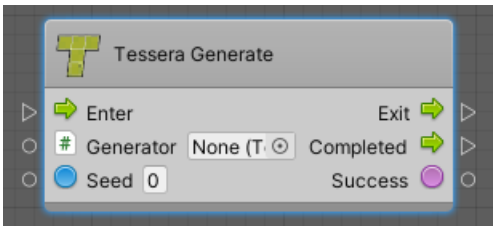
When invoking the Generate method, you can set onComplete or onComplete to completely replace the the default behaviour with your own code. There's an example in the API.

# Bolt Support

Tessera includes some additional support for Bolt, Unity's visual scripting language.

To enable it, first install Bolt, select `Assets > Import Custom Package...` and select TesseraBolt.unitypackage from the Tessera folder. Finally, go to `Tools > Bolt > Build Unit Options` to load the package.

After doing this, a Unit called `Tessera Generate` should be in the fuzzy finder.




This unit will run a particular generator. It works with events run in coroutine mode.

You can also enable Bolt's autogenerated reflection by adding Tessera to the Bolt's assembly list, but this is not recommended as the full API is a bit complicated to use from a visual scripting language.

## Ports

**Generator**

The TesseraGenerator to run. The default is Self.

**Seed**

Fixes the random generation to particular values. The default is 0, which means a new seed each run

**Initial Constraints**

This port is only visible if you enable `Set Initial Constraints` in the Unit Inspector. Otherwise, the usual generator behaviour of searching the scene for initial constraints occurs.

A `List<GameObject>` specifying TesseraTile and TesseraVolume to constraint the generation by. The default is the empty list.

**Exit**

Runs immediately after Enter.

**Completed**

Runs when the generation is actually completed.

**Success**

Set after completion, to indicate if the generation was successful.

# Using the API

The other tutorials have shown you how to set up a tiles and a generator, without any coding. But now you need to hook up the generation to the rest of your level.

To do so, you need to call Generate or StartGenerate. Generate will run synchoronously, and return details about the generation. It's easier to use, but can cause noticable stutter if you are doing a big generation. StartGenerate behaves exactly the same, but can be used from a Unity coroutine.

Because co-routines cannot return information, you can instead supply various callbacks using TesseraGenerateOptions. Most commonly, you'll want to set onCreate to replace the behaviour for instantiating new tiles. The default behaviour instantiates them all at once, which can cause stutter.

```
using UnityEngine;
using Tessera;
using System.Collections;

public class MyBehaviour : MonoBehaviour
{
    private TesseraGenerator generator;

    void Start()
    {
        generator = GetComponent<TesseraGenerator>();
        StartCoroutine(MyCoro());
    }

    IEnumerator MyCoro()
    {
        var options = new TesseraGenerateOptions { onCreate = MyCreate };
        yield return generator.StartGenerate(options);
        // Any following code will be run after the generation
    }

    void MyCreate(TesseraTileInstance instance)
    {
        Debug.Log("Creating " + instance.Tile.gameObject.name);
        // Do the default behaviour
        TesseraGenerator.Instantiate(instance, generator.gameObject);
    }
}
```

Here's an example of overriding onComplete, to so we can create the tiles one at a time rather than all at once:

```
using UnityEngine;
using Tessera;
using System.Collections;
using System.Collections.Generic;


public class MyBehaviour : MonoBehaviour
{
    private TesseraGenerator generator;

    void Start()
    {
        generator = GetComponent<TesseraGenerator>();
        StartCoroutine(MyCoro());
    }

    IEnumerator MyCoro()
    {
        IList<TesseraTileInstance> instances = null;
        var options = new TesseraGenerateOptions
        {
            onComplete = completion =>
            {
                if(completion.success)
                {
                    instances = completion.tileInstances;
                }
            }
        };
        yield return generator.StartGenerate(options);

        if(instances != null)
        {
            foreach(var instance in instances)
            {
                TesseraGenerator.Instantiate(instance, generator.gameObject);
                // Wait for next frame.
                yield return null;
            }
        }
    }
}
```

# Customization

If you have Tessera Pro, then you have the full source code of the project.

You can change this in any way you see fit, but here are some specific ideas you may find useful. Please note that we do not guarantee these will be stable with later versions of Tessera Pro.

## Customize the model.

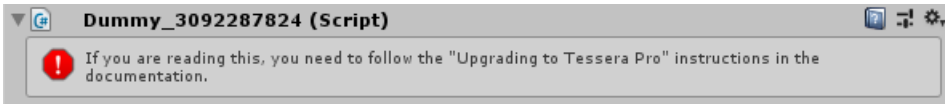
Tessera uses an open source library called DeBroglie for the actual generation process. DeBroglie is initialized in `TesseraGeneratorHelper.Setup`. It has many options that are not directly exposed by Tessera, which can be set by changing the code.

It is recommended you familiarize yourself with DeBroglie's documentation before trying this.

# Upgrading from Tessera to Tessera Pro

Unfortunately, it's not possible to preserve compatibility in Unity when replacing a .dll with a set of scripts.

If you previously developed a game with Tessera, and you have now downloaded Tessera Pro instead, you'll see the following error.




Don't panic. All your data is still there.

To fix it, please backup your project, then run `Tools > Tessera > Upgrade Scene to Tessera Pro`.

If you like, you can delete all the "dummy" files in the Tessera folder - these files only exist to simplify this transition.

# Advanced

If you don't like upgrading scene by scene, you can edit Unity's yaml directly. The following instructions replace the main script references.

Find: `fileID: -65694588, guid: 5ec9deea42ffdf94eae3261973878f98`
Replace: `fileID: 11500000, guid: e3ad2bf01b7a6b7409eb683402aa8669`

Find: `fileID: 2003858105, guid: 5ec9deea42ffdf94eae3261973878f98`
Replace: `fileID: 11500000, guid: 8a3f7e4cbfb5a184b8e397a0175d7112`

Find: `fileID: -96226770, guid: 5ec9deea42ffdf94eae3261973878f98`
Replace: `fileID: 11500000, guid: 333e56fb2e5d1ff4bb53c10611586ded`

Find: `fileID: 1044799892, guid: 5ec9deea42ffdf94eae3261973878f98`
Replace: `fileID: 11500000, guid: d1efb6dc65363b7479c2f8be4b856e61`

Save your changes, then reload the scene in Unity. If done correctly, the scripts should now work.

# Downgrading

Downgrades can be done by following the Advanced instructions, reversing Find and Replace.

# Release notes

## 4.0.0

- Hexagonal and triangular tiles are now supported. (Pro only)
- Triangle mesh surfaces now supported (instead of just quad meshes) (Pro only)
- AnimatedGenerator has some support for multithreading (Pro only)
- Major internal refactoring
- Some performance improvements
- Worker thread now registers with Unity's profiler
- Improvements to provided samples
- Better support for Unity 2020
- Now easier to access the completion object after calling StartGenerate.
- Fixes some issues with Big Tiles on mesh surfaces (Pro only)
- Fix surface meshes reflecting every tile by default (Pro only)
- Removed TesseraGenerator.initialConstraints (use TesseraGeneratorOptions.initialConstraints)
- Fixed using `instantiateChildrenOnly` with `TesseraMeshOutput`

## 3.4.1

- Instantiated tiles now have names that include their cell location.
- Fix exception in PathConstraint when Prioritize is on.
- Fix Volumes
- Fix rare issue with big tiles on mesh surfaces.
- Warn if meshes are not readable and using Mesh Output.

## 3.4.0

- Performance improvements with pins and volumes
- Volumes can now be set to MaskOut
- Refactored GetInitialConstraint methods and TessaraVolumeFilter (breaking)
- Fixed exception with out of bounds palette indices
- Fixed interaction between big tiles and path constraint (Pro only)

## 3.3.0

- Pinned Tile Constraints now work on Surface Meshes (Pro only).
- Refactored some code, changed API of ITesseraTileOutput (Pro only) (breaking)
- Added "Fix It" for inconsistent tile sizes.
- Added TesseraPinned for more initial constraint options.
- Added extra samples
- Added "Upgrade to Tessera Pro" utility (Pro only)

## 3.2.0

- Tile rotations no longer confined to XZ plane
- Added tooltips to inspector
- Mirror constraint now supports on all 3 axes (Pro only)
- Add support for Bolt

## 3.1.2

- Fixed Instantiate Only Children to work with mesh deformations
- Fixed "BoxColliders do not support negative scale or size" warning.
- Fixed generation on mesh surfaces with multiple layers
- Volumes work with generation on mesh surfaces
- Improved Smooth Normals setting

# 3.1.1

- Asset can now be loaded in Unity 2019.1 and 2019.2
- Fixed the missing script in the Castle sample

# 3.1.0

- Add Tessera Volume
- Dungeon example now demos Volumes
- WebGL builds now ignore the multithreaded option
- Can now choose whether normals should be smooth or not when generating on a surface (Pro only)
- Can now filter tiles per-submesh when generating on a surface (Pro only)
- Add Prioritize option to PathConstraint (Pro only)
- Add Separation constraint (Pro only)
- Added City example to Samples (Pro only)
- Fixed bug in AnimatedGenerator
- Fixed bug when normal smoothing

# 3.0.0

- Various api changes, larger internal refactorings (breaking)
- Support generation on surface of a mesh (Pro only)
- Paint tools no longer switches off when you click children of tiles
- Add Clear and Regenerate methods
- Improved validation messages
- Fixed exception for Mesh Output when materials are missing

# 2.3.0

- Tessera Palette now serializes correctly
- Fix some Inspector display glitches in Unity 2019.3
- Mesh output can now be animated (Pro only)

# 2.2.0

- Generation can now be animated (Pro only)
- Tilemap output (Pro only)
- Mesh output (Pro only)
- Added "Show all" view option when painting.

# 2.1.0

- Added a palette asset that lets you:
    - Customize the paint colors Tessera uses
    - Name the colors (shows in tooltips)
    - Control what colors match each other

- Added a new sample, Platformer
- Fixed a bug that prevented the use of big tiles as fixed tile constraints
- A warning is now emitted if inconsistent tileSizes are used
- Multithreading can now be disabled, for platforms that don't support it.

# v2.0.0

- Some performance improvements
- Visible source code (Pro only)
- Added CountConstraint (Pro only)
- Added MirrorConstraint (Pro only)
- Added PathConstraint (Pro only)
- Seeds have changed (breaking)
- Removed `defaultParent` (breaking)
- Added a new sample, Dungeon.

# v1.1.1

- Fixed issue with reflected tiles using incorrect rotation for bottom face

# v1.1.0

- Fixed "BeginLayoutGroup must be called first" errors.
- Fixed issue with rotated initial tile constraints.
- Fixed a display glitch in orthographic views
- Added keyboard shortcuts:
    - Delete to remove tiles from the generators list.
    - Z to toggle backfaces.
- Added another scene to samples.
- Improved documentation on constraints.
- Added contradictionLocation

# v1.0.1

- Removed a Debug.Log line
- Random seed can now be set. Default from Unity.Random.
- "Clear Children" button on Generator component.
- Fix spurious exceptions when calling Generate.

# v1.0.0

- Initial release

# Namespace Tessera

Classes

### AnimatedGenerator

Attach this to a TesseraGenerator to run the generator stepwise over several updates, displaying the changes so far.

**Note**

This class is available only in Tessera Pro

### BiMap<U, V>

Represents a 1:1 mapping between two types

### CountConstraint

Keeps track of the number of tiles in a given set, and ensure it is less than / more than a given number.

**Note**

This class is available only in Tessera Pro

### CubeCellType

### CubeFaceDirExtensions

### EnumeratorWithResult<T>

An IEnumerator that also records a given result when it is finished. It is intended for use with Unity coroutines.

### FaceDetails

Records the painted colors for a single face of one cube in a TesseraTile

### HexGeometryUtils

**Note**

This class is available only in Tessera Pro

### HexPrismCellType

**Note**

This class is available only in Tessera Pro

### HexPrismFaceDirExtensions

**Note**

This class is available only in Tessera Pro

### InstantiateOutput

### MeshData

A replacement for UnityEngine.Mesh that stores all the data in memory, for fast access from C#.

**Note**

This class is available only in Tessera Pro

### MeshDeformation

Encapsulates an arbitrary deformation of mesh vertices

**Note**

This class is available only in Tessera Pro

### MeshUtils

Utility for working with meshes.

**Note**

This class is available only in Tessera Pro

### MirrorConstraint

Ensures that the generation is symmetric when x-axis mirrored. If there are any tile constraints, they will not be mirrored.

**Note**

This class is available only in Tessera Pro

### PaletteEntry

### PathConstraint

Forces a network of tiles to connect with each other, so there is always a complete path between them. Two tiles connect along the path if:

- Both tiles are in pathTiles (if hasPathTiles set); and
- The central color of the sides of the tiles leading to each other are in pathColors (if pathColors set)

**Note**

This class is available only in Tessera Pro

### QuadInterpolation

### SeparationConstraint

### TesseraCompletion

Returned by TesseraGenerator after generation finishes

### TesseraConstraint

Abstract class for all generator constraint components.

**Note**

This class is available only in Tessera Pro

### TesseraGenerateOptions

Additional settings to customize the generation at runtime.

### TesseraGenerator

GameObjects with this behaviour contain utilities to generate tile based levels using Wave Function Collapse (WFC). Call Generate(TesseraGenerateOptions) or StartGenerate(TesseraGenerateOptions) to run. The generation takes the following steps:

- Inspect the tiles in tiles and work out how they rotate and connect to each other.
- Setup any initial constraints that fix parts of the generation (initialConstraints).
- Fix the boundary of the generation if skyBox is set.
- Generate a set of tile instances that fits the above tiles and constraints.
- Optionally retries or backtrack.
- Instantiates the tile instances.

### TesseraHexTile

GameObjects with this behaviour record adjacency information for use with a TesseraGenerator.

### TesseraInitialConstraint

Initial constraint objects fix parts of the generation process in places. Use the utility methods on TesseraGenerator to create these objects.

### TesseraInitialConstraintBuilder

### TesseraMeshOutput

Attach this to a TesseraGenerator to output the tiles to a single mesh instead of instantiating them.

> Note

This class is available only in Tessera Pro

### TesseraPalette

### TesseraPinConstraint

### TesseraPinned

### TesseraTile

GameObjects with this behaviour record adjacency information for use with a TesseraGenerator.

### TesseraTileBase

### TesseraTileInstance

Represents a request to instantiate a TesseraTile, post generation.

### TesseraTilemapOutput

Attach this to a TesseraGenerator to output the tiles to a Unity Tilemap component instead of directly instantiating them.

> Note

This class is available only in Tessera Pro

### TesseraTransformedTile

Definesa Unity tile that has a specific transform applied to it. Used by TesseraTilemapOutput

### TesseraTrianglePrismTile

GameObjects with this behaviour record adjacency information for use with a TesseraGenerator.

### TesseraVolume

### TesseraVolumeFilter

### TileEntry

Specifies a tile to be used by TesseraGenerator

### TileList

### TriangleInterpolation

### TrianglePrismCellType

> Note

This class is available only in Tessera Pro

### TrianglePrismFaceDirExtensions

Note

This class is available only in Tessera Pro

### TrianglePrismGeometryUtils

Note

This class is available only in Tessera Pro

### TRS

Rerpresents a position / rotation and scale. Much like a Transform, but without the association with a unity object.

## Structs

### CubeRotation

### HexRotation

Represents rotations / reflections of a hexagon

Note

This class is available only in Tessera Pro

### OrientedFace

Records the painted colors and location of single face of one cube in a TesseraTile

### TriangleRotation

Represents rotations / reflections of a hexagon

Note

This class is available only in Tessera Pro

## Interfaces

### ICellType

### IGrid

Represents a arrangement of cells, including their adjacency and locations. Cells are uniquely identified by a Vector3Int. Tessera.IGrid is roughly equivalent to DeBroglie.Topo.ITopology.

### ITesseraInitialConstraint

### ITesseraTileOutput

## Enums

### AnimatedGenerator.AnimatedGeneratorState

### CellFaceDir

Represents a particular face of a generic cell. The enum is empty - to work with directions, you need to either:

- Use the methods on ICellType.
- Cast to the enum specific to a given cell type, e.g. CubeFaceDir.

### CellRotation

### CubeFaceDir

Enum of the 6 faces on a cube.

### HexPrismFaceDir

Enum of the 8 faces on a hex prism.

**Note**

This class is available only in Tessera Pro

### MirrorConstraint.Axis

### PinType

### RotationGroupType

### TrianglePrismFaceDir

**Note**

This class is available only in Tessera Pro

### VolumeType

# Class AnimatedGenerator

Attach this to a TesseraGenerator to run the generator stepwise over several updates, displaying the changes so far.

**Note**

This class is available only in Tessera Pro

Inheritance

Object

AnimatedGenerator

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class AnimatedGenerator : MonoBehaviour
```

## Fields

### multithread

If true, use threading to avoid stalling Unity. (ignored on WebGL builds)

Declaration

```
public bool multithread
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### progressPerStep

Declaration

```
public float progressPerStep
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Single | |

### scaleUncertainyTile

If true, the uncertainty tiles shrink as the solver gets more certain.

Declaration

```
public bool scaleUncertainyTile
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### secondsPerStep

Declaration

```
public float secondsPerStep
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Single | |

### uncertaintyTile

Game object to show in cells that have yet to be fully solved.

Declaration

```
public GameObject uncertaintyTile
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| GameObject | |

## Properties

### IsStarted

Declaration

```
public bool IsStarted { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### State

Declaration

```
public AnimatedGenerator.AnimatedGeneratorState State { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| AnimatedGenerator.AnimatedGeneratorState | |

## Methods

### PauseGeneration()

Declaration

```
public void PauseGeneration()
```

### ResumeGeneration()

Declaration

```
public void ResumeGeneration()
```

### StartGeneration()

Declaration

```
public void StartGeneration()
```

### Step()

Declaration

```
public void Step()
```

### StopGeneration()

Declaration

```
public void StopGeneration()
```

# Enum AnimatedGenerator.AnimatedGeneratorState

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public enum AnimatedGeneratorState
```

## Fields

| NAME | DESCRIPTION |
| --- | --- |
| Initializing | |
| Paused | |
| Running | |
| Stopped | |

# Class BiMap<U, V>

Represents a 1:1 mapping between two types

Inheritance

Object

BiMap<U, V>

Implements

IEnumerable<ValueTuple<U, V>>

IEnumerable

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class BiMap<U, V> : IEnumerable<(U, V)>, IEnumerable
```

Type Parameters

| NAME | DESCRIPTION |
| --- | --- |
| U | |
| V | |

## Constructors

### BiMap(IEnumerable<(U, V)>)

Declaration

```
public BiMap(IEnumerable<(U, V)> data)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| IEnumerable<ValueTuple<U, V>> | data | |

## Properties

### Count

Declaration

```
public int Count { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### Item[U]

Declaration

```
public V this[U u] { get; }
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| U | u | |

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| V | |

### Item[V]

Declaration

```
public U this[V v] { get; }
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| V | v | |

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| U | |

## Methods

### GetEnumerator()

Declaration

```
public IEnumerator<(U, V)> GetEnumerator()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IEnumerator<ValueTuple<U, V>> | |

## Explicit Interface Implementations

### IEnumerable.GetEnumerator()

Declaration

```
IEnumerator IEnumerable.GetEnumerator()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IEnumerator | |

## Implements

System.Collections.Generic.IEnumerable<T>
System.Collections.IEnumerable

# Enum CellFaceDir

Represents a particular face of a generic cell. The enum is empty - to work with directions, you need to either:

- Use the methods on ICellType.
- Cast to the enum specific to a given cell type, e.g. CubeFaceDir.

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public enum CellFaceDir
```

# Enum CellRotation

Namespace: Tessera

Assembly: cs.temp.dll.dll

## Syntax

```
public enum CellRotation
```

# Class CountConstraint

Keeps track of the number of tiles in a given set, and ensure it is less than / more than a given number.

**Note**

This class is available only in Tessera Pro

Inheritance

Object
TesseraConstraint
CountConstraint

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class CountConstraint : TesseraConstraint
```

## Fields

### comparison

How to compare the count of tiles to count.

Declaration

```
public CountComparison comparison
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| CountComparison | |

### count

The count to be compared against.

Declaration

```
public int count
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### eager

If set, this constraint will attempt to pick tiles as early as possible. This can give a better random distribution, but higher chance of contradictions.

Declaration

```
public bool eager
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### tiles

The set of tiles to count

Declaration

```
public List<TesseraTileBase> tiles
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| List<TesseraTileBase> | |

# Class CubeCellType

Inheritance

Object

CubeCellType

Implements

ICellType

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class CubeCellType : ICellType
```

## Properties

### Instance

Declaration

```
public static CubeCellType Instance { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| CubeCellType | |

## Methods

### FindPath(Vector3Int, Vector3Int)

Declaration

```
public IEnumerable<CellFaceDir> FindPath(Vector3Int startOffset, Vector3Int endOffset)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | startOffset | |
| Vector3Int | endOffset | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IEnumerable<CellFaceDir> | |

### GetCellCenter(Vector3Int, Vector3, Vector3)

Declaration

```
public Vector3 GetCellCenter(Vector3Int offset, Vector3 center, Vector3 tileSize)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | offset | |
| Vector3 | center | |
| Vector3 | tileSize | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

### GetFaceDirPairs()

Declaration

```
public IEnumerable<(CellFaceDir, CellFaceDir)> GetFaceDirPairs()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IEnumerable<ValueTuple<CellFaceDir, CellFaceDir>> | |

### GetFaceDirs()

Declaration

```
public IEnumerable<CellFaceDir> GetFaceDirs()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IEnumerable<CellFaceDir> | |

### GetIdentity()

Declaration

```
public CellRotation GetIdentity()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellRotation | |

### GetMatrix(CellRotation)

Declaration

```
public Matrix4x4 GetMatrix(CellRotation cellRotation)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellRotation | cellRotation | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Matrix4x4 | |

### GetRotations(Boolean, Boolean, RotationGroupType)

Declaration

```
public IList<CellRotation> GetRotations(bool rotatable, bool reflectable, RotationGroupType rotationGroupType)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Boolean | rotatable | |
| Boolean | reflectable | |
| RotationGroupType | rotationGroupType | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IList<CellRotation> | |

### Invert(CellFaceDir)

Declaration

```
public CellFaceDir Invert(CellFaceDir faceDir)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellFaceDir | faceDir | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellFaceDir | |

### Invert(CellRotation)

Declaration

```
public CellRotation Invert(CellRotation a)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellRotation | a | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellRotation | |

### Multiply(CellRotation, CellRotation)

Declaration

```
public CellRotation Multiply(CellRotation a, CellRotation b)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellRotation | a | |
| CellRotation | b | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellRotation | |

### Rotate(CellFaceDir, CellRotation)

Declaration

```
public CellFaceDir Rotate(CellFaceDir faceDir, CellRotation rotation)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellFaceDir | faceDir | |
| CellRotation | rotation | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellFaceDir | |

### RotateBy(CellFaceDir, FaceDetails, CellRotation)

Declaration

```
public (CellFaceDir, FaceDetails) RotateBy(CellFaceDir faceDir, FaceDetails faceDetails, CellRotation rot)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellFaceDir | faceDir | |
| FaceDetails | faceDetails | |
| CellRotation | rot | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| ValueTuple<CellFaceDir, FaceDetails> | |

### TryMove(Vector3Int, CellFaceDir, out Vector3Int)

Declaration

```
public bool TryMove(Vector3Int offset, CellFaceDir dir, out Vector3Int dest)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | offset | |
| CellFaceDir | dir | |
| Vector3Int | dest | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

## Implements

ICellType

# Enum CubeFaceDir

Enum of the 6 faces on a cube.

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public enum CubeFaceDir
```

## Fields

| NAME | DESCRIPTION |
| --- | --- |
| Back | |
| Down | |
| Forward | |
| Left | |
| Right | |
| Up | |

# Class CubeFaceDirExtensions

Inheritance

Object

CubeFaceDirExtensions

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public static class CubeFaceDirExtensions
```

## Methods

### Forward(CubeFaceDir)

Declaration

```
public static Vector3Int Forward(this CubeFaceDir faceDir)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CubeFaceDir | faceDir | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3Int | The normal vector for a given face. |

### Inverted(CubeFaceDir)

Declaration

```
public static CubeFaceDir Inverted(this CubeFaceDir faceDir)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CubeFaceDir | faceDir | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CubeFaceDir | Returns the face dir with the opposite normal vector. |

### Up(CubeFaceDir)

Declaration

```
public static Vector3Int Up(this CubeFaceDir faceDir)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CubeFaceDir | faceDir | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3Int | Returns (0, 1, 0) vector for most faces, and returns (0, 0, 1) for the top/bottom faces. |

# Struct CubeRotation

Inherited Members

ValueType.ToString()

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public struct CubeRotation
```

## Properties

### All

Declaration

```
public static IEnumerable<CubeRotation> All { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| IEnumerable<CubeRotation> | |

### Identity

Declaration

```
public static CubeRotation Identity { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| CubeRotation | |

### IsReflection

Declaration

```
public bool IsReflection { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### ReflectX

Declaration

```
public static CubeRotation ReflectX { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| CubeRotation | |

### ReflectY

Declaration

```
public static CubeRotation ReflectY { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| CubeRotation | |

### ReflectZ

Declaration

```
public static CubeRotation ReflectZ { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| CubeRotation | |

### RotateXY

Declaration

```
public static CubeRotation RotateXY { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| CubeRotation | |

### RotateXZ

Declaration

```
public static CubeRotation RotateXZ { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| CubeRotation | |

### RotateYZ

Declaration

```
public static CubeRotation RotateYZ { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| CubeRotation | |

## Methods

### Equals(Object)

Declaration

```
public override bool Equals(object obj)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Object | obj | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

Overrides

ValueType.Equals(Object)

### GetHashCode()

Declaration

```
public override int GetHashCode()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

Overrides

ValueType.GetHashCode()

### Invert()

Declaration

```
public CubeRotation Invert()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CubeRotation | |

## Operators

### Equality(CubeRotation, CubeRotation)

Declaration

```
public static bool operator ==(CubeRotation a, CubeRotation b)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CubeRotation | a | |

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CubeRotation | b | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### Implicit(CellRotation to CubeRotation)

Declaration

```
public static implicit operator CubeRotation(CellRotation r)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellRotation | r | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CubeRotation | |

### Implicit(CubeRotation to CellRotation)

Declaration

```
public static implicit operator CellRotation(CubeRotation r)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CubeRotation | r | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellRotation | |

### Inequality(CubeRotation, CubeRotation)

Declaration

```
public static bool operator !=(CubeRotation a, CubeRotation b)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CubeRotation | a | |
| CubeRotation | b | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### Multiply(CubeRotation, CubeFaceDir)

Declaration

```
public static CubeFaceDir operator *(CubeRotation r, CubeFaceDir dir)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CubeRotation | r | |
| CubeFaceDir | dir | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CubeFaceDir | |

### Multiply(CubeRotation, CubeRotation)

Declaration

```
public static CubeRotation operator *(CubeRotation a, CubeRotation b)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CubeRotation | a | |
| CubeRotation | b | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CubeRotation | |

### Multiply(CubeRotation, Vector3)

Declaration

```
public static Vector3 operator *(CubeRotation r, Vector3 v)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CubeRotation | r | |
| Vector3 | v | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

### Multiply(CubeRotation, Vector3Int)

Declaration

```
public static Vector3Int operator *(CubeRotation r, Vector3Int v)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CubeRotation | r | |
| Vector3Int | v | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3Int | |

# Class EnumeratorWithResult<T>

An IEnumerator that also records a given result when it is finished. It is intended for use with Unity coroutines.

Inheritance

Object

EnumeratorWithResult<T>

Implements

IEnumerator

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class EnumeratorWithResult<T> : IEnumerator
```

Type Parameters

| NAME | DESCRIPTION |
| --- | --- |
| T | |

## Constructors

### EnumeratorWithResult(IEnumerator)

Declaration

```
public EnumeratorWithResult(IEnumerator e)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| IEnumerator | e | |

## Properties

### Current

Declaration

```
public object Current { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Object | |

### Result

The value returned by this enumerator. This will throw if you attempt to access it before fully iterating through the enumerator.

Declaration

```
public T Result { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| T | |

## Methods

### MoveNext()

Declaration

```
public bool MoveNext()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### Reset()

Declaration

```
public void Reset()
```

### TryGetResult(out T)

The value returned by this enumerator. This will return false if you attempt to access it before fully iterating through the enumerator.

Declaration

```
public bool TryGetResult(out T result)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| T | result | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

## Implements

System.Collections.IEnumerator

# Class FaceDetails

Records the painted colors for a single face of one cube in a TesseraTile

Inheritance

Object

FaceDetails

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
[Serializable]
public class FaceDetails
```

## Fields

### bottom

Declaration

```
public int bottom
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### bottomLeft

Declaration

```
public int bottomLeft
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### bottomRight

Declaration

```
public int bottomRight
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### center

Declaration

```
public int center
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### hexBottomRightAndRight

Declaration

```
public int hexBottomRightAndRight
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### hexLeftAndBottomLeft

Declaration

```
public int hexLeftAndBottomLeft
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### hexRightAndTopRight

Declaration

```
public int hexRightAndTopRight
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### hexTopLeftAndLeft

Declaration

```
public int hexTopLeftAndLeft
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### left

Declaration

```
public int left
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### right

Declaration

```
public int right
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### top

Declaration

```
public int top
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### topLeft

Declaration

```
public int topLeft
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### topRight

Declaration

```
public int topRight
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

## Properties

### hexBottomLeft

Declaration

```
public int hexBottomLeft { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### hexBottomLeftAndBottomRight

Declaration

```
public int hexBottomLeftAndBottomRight { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### hexBottomRight

Declaration

```
public int hexBottomRight { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### hexCenter

Declaration

```
public int hexCenter { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### hexLeft

Declaration

```
public int hexLeft { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### hexRight

Declaration

```
public int hexRight { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### hexTopLeft

Declaration

```
public int hexTopLeft { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### hexTopRight

Declaration

```
public int hexTopRight { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### hexTopRightAndTopLeft

Declaration

```
public int hexTopRightAndTopLeft { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

## Methods

### ToString()

Declaration

```
public override string ToString()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| String | |

Overrides

Object.ToString()

# Class HexGeometryUtils

Note

This class is available only in Tessera Pro

Inheritance

Object

HexGeometryUtils

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public static class HexGeometryUtils
```

## Methods

### FromSide(Int32)

Declaration

```
public static HexPrismFaceDir FromSide(int side)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Int32 | side | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| HexPrismFaceDir | |

### GetCellCenter(Vector3Int, Vector3, Vector3)

Declaration

```
public static Vector3 GetCellCenter(Vector3Int cell, Vector3 origin, Vector3 tileSize)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | cell | |
| Vector3 | origin | |
| Vector3 | tileSize | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

# Class HexPrismCellType

Note

This class is available only in Tessera Pro

Inheritance

Object

HexPrismCellType

Implements

ICellType

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class HexPrismCellType : ICellType
```

## Properties

### Instance

Declaration

```
public static HexPrismCellType Instance { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| HexPrismCellType | |

## Methods

### FindPath(Vector3Int, Vector3Int)

Declaration

```
public IEnumerable<CellFaceDir> FindPath(Vector3Int startOffset, Vector3Int endOffset)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | startOffset | |
| Vector3Int | endOffset | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IEnumerable<CellFaceDir> | |

### GetCellCenter(Vector3Int, Vector3, Vector3)

Declaration

```
public Vector3 GetCellCenter(Vector3Int offset, Vector3 center, Vector3 tileSize)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | offset | |
| Vector3 | center | |
| Vector3 | tileSize | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

### GetFaceDirPairs()

Declaration

```
public IEnumerable<(CellFaceDir, CellFaceDir)> GetFaceDirPairs()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IEnumerable<ValueTuple<CellFaceDir, CellFaceDir>> | |

### GetFaceDirs()

Declaration

```
public IEnumerable<CellFaceDir> GetFaceDirs()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IEnumerable<CellFaceDir> | |

### GetIdentity()

Declaration

```
public CellRotation GetIdentity()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellRotation | |

### GetMatrix(CellRotation)

Declaration

```
public Matrix4x4 GetMatrix(CellRotation rotation)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellRotation | rotation | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Matrix4x4 | |

### GetRotations(Boolean, Boolean, RotationGroupType)

Declaration

```
public IList<CellRotation> GetRotations(bool rotatable, bool reflectable, RotationGroupType rotationGroupType)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Boolean | rotatable | |
| Boolean | reflectable | |
| RotationGroupType | rotationGroupType | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IList<CellRotation> | |

### Invert(CellFaceDir)

Declaration

```
public CellFaceDir Invert(CellFaceDir faceDir)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellFaceDir | faceDir | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellFaceDir | |

### Invert(CellRotation)

Declaration

```
public CellRotation Invert(CellRotation a)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellRotation | a | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellRotation | |

### Multiply(CellRotation, CellRotation)

Declaration

```
public CellRotation Multiply(CellRotation a, CellRotation b)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellRotation | a | |
| CellRotation | b | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellRotation | |

### Rotate(CellFaceDir, CellRotation)

Declaration

```
public CellFaceDir Rotate(CellFaceDir faceDir, CellRotation rotation)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellFaceDir | faceDir | |
| CellRotation | rotation | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellFaceDir | |

### RotateBy(CellFaceDir, FaceDetails, CellRotation)

Declaration

```
public (CellFaceDir, FaceDetails) RotateBy(CellFaceDir faceDir, FaceDetails faceDetails, CellRotation
rotation)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellFaceDir | faceDir | |
| FaceDetails | faceDetails | |
| CellRotation | rotation | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| ValueTuple<CellFaceDir, FaceDetails> | |

### TryMove(Vector3Int, CellFaceDir, out Vector3Int)

Declaration

```
public bool TryMove(Vector3Int offset, CellFaceDir dir, out Vector3Int dest)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | offset | |
| CellFaceDir | dir | |
| Vector3Int | dest | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

## Implements

ICellType

# Enum HexPrismFaceDir

Enum of the 8 faces on a hex prism.

Note

This class is available only in Tessera Pro

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public enum HexPrismFaceDir
```

## Fields

| NAME | DESCRIPTION |
| --- | --- |
| BackLeft | |
| BackRight | |
| Down | |
| ForwardLeft | |
| ForwardRight | |
| Left | |
| Right | |
| Up | |

# Class HexPrismFaceDirExtensions

Note

This class is available only in Tessera Pro

Inheritance

Object

HexPrismFaceDirExtensions

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public static class HexPrismFaceDirExtensions
```

## Methods

### Forward(HexPrismFaceDir)

Declaration

```
public static Vector3 Forward(this HexPrismFaceDir dir)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| HexPrismFaceDir | dir | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

### ForwardInt(HexPrismFaceDir)

Declaration

```
public static Vector3Int ForwardInt(this HexPrismFaceDir dir)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| HexPrismFaceDir | dir | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3Int | |

### GetSide(HexPrismFaceDir)

Declaration

```
public static int GetSide(this HexPrismFaceDir dir)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| HexPrismFaceDir | dir | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### IsUpDown(HexPrismFaceDir)

Declaration

```
public static bool IsUpDown(this HexPrismFaceDir dir)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| HexPrismFaceDir | dir | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### Up(HexPrismFaceDir)

Declaration

```
public static Vector3 Up(this HexPrismFaceDir dir)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| HexPrismFaceDir | dir | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

# Struct HexRotation

Represents rotations / reflections of a hexagon

Note

This class is available only in Tessera Pro

Inherited Members

ValueType.ToString()

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public struct HexRotation
```

## Properties

### All

Declaration

```
public static HexRotation[] All { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| HexRotation[] | |

### Identity

Declaration

```
public static HexRotation Identity { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| HexRotation | |

### IsReflection

Declaration

```
public bool IsReflection { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### ReflectForwardLeft

Declaration

```
public static HexRotation ReflectForwardLeft { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| HexRotation | |

### ReflectForwardRight

Declaration

```
public static HexRotation ReflectForwardRight { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| HexRotation | |

### ReflectX

Declaration

```
public static HexRotation ReflectX { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| HexRotation | |

### ReflectZ

Declaration

```
public static HexRotation ReflectZ { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| HexRotation | |

### RotateCCW

Declaration

```
public static HexRotation RotateCCW { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| HexRotation | |

### Rotation

Declaration

```
public int Rotation { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

## Methods

### Equals(Object)

Declaration

```
public override bool Equals(object obj)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Object | obj | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

Overrides

ValueType.Equals(Object)

### GetHashCode()

Declaration

```
public override int GetHashCode()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

Overrides

ValueType.GetHashCode()

### Invert()

Declaration

```
public HexRotation Invert()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| HexRotation | |

### Rotate60(Int32)

Declaration

```
public static HexRotation Rotate60(int i)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Int32 | i | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| HexRotation | |

## Operators

### Equality(HexRotation, HexRotation)

Declaration

```
public static bool operator ==(HexRotation a, HexRotation b)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| HexRotation | a | |
| HexRotation | b | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### Implicit(CellRotation to HexRotation)

Declaration

```
public static implicit operator HexRotation(CellRotation r)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellRotation | r | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| HexRotation | |

### Implicit(HexRotation to CellRotation)

Declaration

```
public static implicit operator CellRotation(HexRotation r)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| HexRotation | r | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellRotation | |

### Inequality(HexRotation, HexRotation)

Declaration

```
public static bool operator !=(HexRotation a, HexRotation b)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| HexRotation | a | |
| HexRotation | b | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### Multiply(HexRotation, Int32)

Declaration

```
public static int operator *(HexRotation a, int side)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| HexRotation | a | |
| Int32 | side | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### Multiply(HexRotation, HexPrismFaceDir)

Declaration

```
public static HexPrismFaceDir operator *(HexRotation rotation, HexPrismFaceDir faceDir)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| HexRotation | rotation | |
| HexPrismFaceDir | faceDir | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| HexPrismFaceDir | |

### Multiply(HexRotation, HexRotation)

Declaration

```
public static HexRotation operator *(HexRotation a, HexRotation b)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| HexRotation | a | |
| HexRotation | b | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| HexRotation | |

# Interface ICellType

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public interface ICellType
```

## Methods

### FindPath(Vector3Int, Vector3Int)

Declaration

```
IEnumerable<CellFaceDir> FindPath(Vector3Int startOffset, Vector3Int endOffset)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | startOffset | |
| Vector3Int | endOffset | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IEnumerable<CellFaceDir> | |

### GetCellCenter(Vector3Int, Vector3, Vector3)

Declaration

```
Vector3 GetCellCenter(Vector3Int offset, Vector3 center, Vector3 tileSize)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | offset | |
| Vector3 | center | |
| Vector3 | tileSize | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

### GetFaceDirPairs()

Declaration

```
IEnumerable<(CellFaceDir, CellFaceDir)> GetFaceDirPairs()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IEnumerable<ValueTuple<CellFaceDir, CellFaceDir>> | |

### GetFaceDirs()

Declaration

```
IEnumerable<CellFaceDir> GetFaceDirs()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IEnumerable<CellFaceDir> | |

### GetIdentity()

Declaration

```
CellRotation GetIdentity()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellRotation | |

### GetMatrix(CellRotation)

Declaration

```
Matrix4x4 GetMatrix(CellRotation cellRotation)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellRotation | cellRotation | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Matrix4x4 | |

### GetRotations(Boolean, Boolean, RotationGroupType)

Declaration

```
IList<CellRotation> GetRotations(bool rotatable = true, bool reflectable = true, RotationGroupType
rotationGroupType = RotationGroupType.All)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Boolean | rotatable | |
| Boolean | reflectable | |

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| | | |
| RotationGroupType | rotationGroupType | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IList<CellRotation> | |

### Invert(CellFaceDir)

Declaration

```
CellFaceDir Invert(CellFaceDir faceDir)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellFaceDir | faceDir | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellFaceDir | |

### Invert(CellRotation)

Declaration

```
CellRotation Invert(CellRotation a)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellRotation | a | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellRotation | |

### Multiply(CellRotation, CellRotation)

Declaration

```
CellRotation Multiply(CellRotation a, CellRotation b)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellRotation | a | |

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellRotation | b | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellRotation | |

### Rotate(CellFaceDir, CellRotation)

Declaration

```
CellFaceDir Rotate(CellFaceDir faceDir, CellRotation rotation)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellFaceDir | faceDir | |
| CellRotation | rotation | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellFaceDir | |

### RotateBy(CellFaceDir, FaceDetails, CellRotation)

Declaration

```
(CellFaceDir, FaceDetails) RotateBy(CellFaceDir faceDir, FaceDetails faceDetails, CellRotation rot)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellFaceDir | faceDir | |
| FaceDetails | faceDetails | |
| CellRotation | rot | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| ValueTuple<CellFaceDir, FaceDetails> | |

### TryMove(Vector3Int, CellFaceDir, out Vector3Int)

Declaration

```
bool TryMove(Vector3Int offset, CellFaceDir dir, out Vector3Int dest)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | offset | |
| CellFaceDir | dir | |
| Vector3Int | dest | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

# Interface IGrid

Represents a arrangement of cells, including their adjacency and locations. Cells are uniquely identified by a Vector3Int. Tessera.IGrid is roughly equivalent to DeBroglie.Topo.ITopology.

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public interface IGrid
```

## Properties

### CellType

Describes what sort of cell can be found in this grid

Declaration

```
ICellType CellType { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| ICellType | |

### IndexCount

Finds a number one larger than the maximum index for an in bounds cell.

Declaration

```
int IndexCount { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

## Methods

### FindCell(Vector3, Matrix4x4, out Vector3Int, out CellRotation)

Returns the cell and rotation for a tile placed in the grid. NB: The cell returned corresponds to offset (0,0,0). The tile may not actually occupy that offset.

Declaration

```
bool FindCell(Vector3 tileCenter, Matrix4x4 tileLocalToGridMatrix, out Vector3Int cell, out CellRotation rotation)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3 | tileCenter | |
| Matrix4x4 | tileLocalToGridMatrix | |

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | cell | |
| CellRotation | rotation | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### FindCell(Vector3, out Vector3Int)

Finds the cell containg the give position

Declaration

```
bool FindCell(Vector3 position, out Vector3Int cell)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3 | position | |
| Vector3Int | cell | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### GetCell(Int32)

Finds the cell associated with a given index.

Declaration

```
Vector3Int GetCell(int index)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Int32 | index | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3Int | |

### GetCellCenter(Vector3Int)

Returns the center of the cell in local space

Declaration

```
Vector3 GetCellCenter(Vector3Int cell)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | cell | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

### GetCells()

Gets a full list of cells in bounds.

Declaration

```
IEnumerable<Vector3Int> GetCells()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IEnumerable<Vector3Int> | |

### GetCellsIntersectsApprox(Bounds)

Gets the set of cells that potentially overlap bounds.

Declaration

```
IEnumerable<Vector3Int> GetCellsIntersectsApprox(Bounds bounds)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Bounds | bounds | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IEnumerable<Vector3Int> | |

### GetIndex(Vector3Int)

Finds the index associated with a given cell. Cell must be in bounds.

Declaration

```
int GetIndex(Vector3Int cell)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | cell | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### GetMoveRotations()

Returns the full set of rotations that TryMove can output. Can just default to CellType.GetRotations();

Declaration

```
IEnumerable<CellRotation> GetMoveRotations()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IEnumerable<CellRotation> | |

### GetTRS(Vector3Int)

Returns the appropriate transform for the cell. The translation will always be to GetCellCenter. Not inclusive of cell rotation, that should be applied first.

Declaration

```
TRS GetTRS(Vector3Int cell)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | cell | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| TRS | |

### GetValidFaceDirs(Vector3Int)

Returns directions we might expect TryMove to work for (though it is not guaranteed). This is mostly useful for heterogenous grids where not every cell is identical.

Declaration

```
IEnumerable<CellFaceDir> GetValidFaceDirs(Vector3Int cell)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | cell | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IEnumerable<CellFaceDir> | |

### InBounds(Vector3Int)

Returns true if the cell is actually in the size specified. Some grids support out of bounds cells, in which case operations like TryMove may need to be filtered.

Declaration

```
bool InBounds(Vector3Int cell)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | cell | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### TryMove(Vector3Int, CellFaceDir, out Vector3Int, out CellFaceDir, out CellRotation)

Attempts to move from a face in a given direction, and returns information about the move if successful. Note that for some grids, this can succeed, and return a cell outside of bounds.

Declaration

```
bool TryMove(Vector3Int cell, CellFaceDir faceDir, out Vector3Int dest, out CellFaceDir inverseFaceDir, out
CellRotation rotation)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | cell | |
| CellFaceDir | faceDir | |
| Vector3Int | dest | |
| CellFaceDir | inverseFaceDir | |
| CellRotation | rotation | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### TryMoveByOffset(Vector3Int, Vector3Int, CellRotation, out Vector3Int)

Given a cell, tries to find another cell at a given offset. This could be done with FindPath(Vector3Int, Vector3Int), but this can be more efficient.

Declaration

```
bool TryMoveByOffset(Vector3Int cell, Vector3Int offset, CellRotation offsetRotation, out Vector3Int dest)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | cell | |
| Vector3Int | offset | |
| CellRotation | offsetRotation | |
| Vector3Int | dest | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

# Class InstantiateOutput

Inheritance

Object

InstantiateOutput

Implements

ITesseraTileOutput

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class InstantiateOutput : ITesseraTileOutput
```

## Constructors

### InstantiateOutput(Transform)

Declaration

```
public InstantiateOutput(Transform transform)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Transform | transform | |

## Properties

### IsEmpty

Declaration

```
public bool IsEmpty { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### SupportsIncremental

Declaration

```
public bool SupportsIncremental { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

## Methods

### ClearTiles()

Declaration

```
public void ClearTiles()
```

## UpdateTiles(TesseraCompletion)

Declaration

```
public void UpdateTiles(TesseraCompletion completion)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TesseraCompletion | completion | |

## Implements

ITesseraTileOutput

# Interface ITesseraInitialConstraint

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public interface ITesseraInitialConstraint
```

## Properties

### Name

Declaration

```
string Name { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| String | |

# Interface ITesseraTileOutput

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public interface ITesseraTileOutput
```

## Properties

### IsEmpty

Is the output currently empty.

Declaration

```
bool IsEmpty { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### SupportsIncremental

Is this output safe to use with AnimatedGenerator

Declaration

```
bool SupportsIncremental { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

## Methods

### ClearTiles()

Clear the output

Declaration

```
void ClearTiles()
```

### UpdateTiles(TesseraCompletion)

Update a chunk of tiles. If inremental updates are supported, then:

- Tiles can replace other tiles, as indicated by the Cells field.
- A tile of null indicates that the tile should be erased

Declaration

```
void UpdateTiles(TesseraCompletion completion)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TesseraCompletion | completion | |

# Class MeshData

A replacement for UnityEngine.Mesh that stores all the data in memory, for fast access from C#.

**Note**

This class is available only in Tessera Pro

Inheritance

Object

MeshData

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class MeshData
```

## Constructors

### MeshData()

Declaration

```
public MeshData()
```

### MeshData(Mesh)

Declaration

```
public MeshData(Mesh mesh)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Mesh | mesh | |

## Fields

### indices

Declaration

```
public int[][] indices
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32[][] | |

### normals

Declaration

```
public Vector3[] normals
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3[] | |

### subMeshCount

Declaration

```
public int subMeshCount
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### tangents

Declaration

```
public Vector4[] tangents
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Vector4[] | |

### topologies

Declaration

```
public MeshTopology[] topologies
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| MeshTopology[] | |

### uv

Declaration

```
public Vector2[] uv
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Vector2[] | |

### vertices

Declaration

```
public Vector3[] vertices
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3[] | |

## Methods

### GetIndices(Int32)

Declaration

```
public int[] GetIndices(int submesh)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Int32 | submesh | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Int32[] | |

### GetTopology(Int32)

Declaration

```
public MeshTopology GetTopology(int submesh)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Int32 | submesh | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| MeshTopology | |

# Class MeshDeformation

Encapsulates an arbitrary deformation of mesh vertices

**Note**

This class is available only in Tessera Pro

Inheritance

Object

MeshDeformation

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class MeshDeformation
```

## Constructors

### MeshDeformation(Func<Vector3, Vector3>, Func<Vector3, Vector3, Vector3>, Func<Vector3, Vector4, Vector4>, Boolean)

Declaration

```
public MeshDeformation(Func<Vector3, Vector3> deformPoint, Func<Vector3, Vector3, Vector3> deformNormal,
Func<Vector3, Vector4, Vector4> deformTangent, bool invertWinding)
```

Parameters

| TYPE | NAME | DESCRIPTION |
|---|---|---|
| Func<Vector3, Vector3> | deformPoint | |
| Func<Vector3, Vector3, Vector3> | deformNormal | |
| Func<Vector3, Vector4, Vector4> | deformTangent | |
| Boolean | invertWinding | |

## Fields

### PostDeform

Declaration

```
public Matrix4x4 PostDeform
```

Field Value

| TYPE | DESCRIPTION |
|---|---|
| Matrix4x4 | |

### PostDeformIT

Declaration

```
public Matrix4x4 PostDeformIT
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Matrix4x4 | |

### PreDeform

Declaration

```
public Matrix4x4 PreDeform
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Matrix4x4 | |

### PreDeformIT

Declaration

```
public Matrix4x4 PreDeformIT
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Matrix4x4 | |

## Properties

### InnerDeformNormal

Declaration

```
public Func<Vector3, Vector3, Vector3> InnerDeformNormal { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Func<Vector3, Vector3, Vector3> | |

### InnerDeformPoint

Declaration

```
public Func<Vector3, Vector3> InnerDeformPoint { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Func<Vector3, Vector3> | |

### InnerDeformTangent

Declaration

```
public Func<Vector3, Vector4, Vector4> InnerDeformTangent { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Func<Vector3, Vector4, Vector4> | |

### InnerInvertWinding

Declaration

```
public bool InnerInvertWinding { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### InvertWinding

Declaration

```
public bool InvertWinding { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

## Methods

### Clone()

Declaration

```
public MeshDeformation Clone()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| MeshDeformation | |

### Deform(Mesh)

Deforms the vertices and normals of a mesh as specified.

Declaration

```
public Mesh Deform(Mesh mesh)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Mesh | mesh | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Mesh | |

### DeformNormal(Vector3, Vector3)

Declaration

```
public Vector3 DeformNormal(Vector3 p, Vector3 v)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3 | p | |
| Vector3 | v | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

### DeformPoint(Vector3)

Declaration

```
public Vector3 DeformPoint(Vector3 p)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3 | p | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

### Transform(Mesh, Int32)

Transforms the vertices and normals of a submesh mesh as specified.

Declaration

```
public Mesh Transform(Mesh mesh, int submesh)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Mesh | mesh | |
| Int32 | submesh | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Mesh | |

## Operators

### Multiply(Matrix4x4, MeshDeformation)

Declaration

```
public static MeshDeformation operator *(Matrix4x4 m, MeshDeformation meshDeformation)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Matrix4x4 | m | |
| MeshDeformation | meshDeformation | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| MeshDeformation | |

### Multiply(MeshDeformation, Matrix4x4)

Declaration

```
public static MeshDeformation operator *(MeshDeformation meshDeformation, Matrix4x4 m)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| MeshDeformation | meshDeformation | |
| Matrix4x4 | m | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| MeshDeformation | |

# Class MeshUtils

Utility for working with meshes.

**Note**

This class is available only in Tessera Pro

Inheritance

Object

MeshUtils

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public static class MeshUtils
```

## Methods

### GetDeformation(MeshData, Single, Single, Boolean, Int32, Int32, Int32)

Transforms from a unit cube centered on the origin to the surface of the mesh

Declaration

```
public static MeshDeformation GetDeformation(MeshData surfaceMesh, float tileHeight, float surfaceOffset, bool smoothNormals, int face, int layer, int subMesh)
```

Parameters

| TYPE | NAME | DESCRIPTION |
|---|---|---|
| MeshData | surfaceMesh | |
| Single | tileHeight | |
| Single | surfaceOffset | |
| Boolean | smoothNormals | |
| Int32 | face | |
| Int32 | layer | |
| Int32 | subMesh | |

Returns

| TYPE | DESCRIPTION |
|---|---|
| MeshDeformation | |

### GetDeformation(MeshData, Single, Single, Boolean, TesseraTileInstance)

Deforms from tile local space to the surface of the mesh

Declaration

```
public static MeshDeformation GetDeformation(MeshData surfaceMesh, float tileHeight, float surfaceOffset, bool smoothNormals, TesseraTileInstance i)
```

Parameters

| TYPE | NAME | DESCRIPTION |
|---|---|---|
| MeshData | surfaceMesh | |
| Single | tileHeight | |
| Single | surfaceOffset | |
| Boolean | smoothNormals | |
| TesseraTileInstance | i | |

Returns

| TYPE | DESCRIPTION |
|---|---|
| MeshDeformation | |

### TileToCube(TesseraTile, Vector3Int)

Matrix that transforms from tile local co-ordinates to a unit centered cube, mapping the cube at the given offset to the unit cube.

Declaration

```
public static Matrix4x4 TileToCube(TesseraTile tile, Vector3Int offset)
```

Parameters

| TYPE | NAME | DESCRIPTION |
|---|---|---|
| TesseraTile | tile | |
| Vector3Int | offset | |

Returns

| TYPE | DESCRIPTION |
|---|---|
| Matrix4x4 | |

### TileToTri(TesseraTrianglePrismTile, Vector3Int)

Declaration

```
public static Matrix4x4 TileToTri(TesseraTrianglePrismTile tile, Vector3Int offset)
```

Parameters

| TYPE | NAME | DESCRIPTION |
|---|---|---|
| TesseraTrianglePrismTile | tile | |
| Vector3Int | offset | |

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| | | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Matrix4x4 | |

### TransformRecursively(GameObject, MeshDeformation)

Applies Transform gameObject and its children. Components affected:

- MeshFilter
- MeshColldier
- BoxCollider

Declaration

```
public static void TransformRecursively(GameObject gameObject, MeshDeformation meshDeformation)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| GameObject | gameObject | |
| MeshDeformation | meshDeformation | |

# Class MirrorConstraint

Ensures that the generation is symmetric when x-axis mirrored. If there are any tile constraints, they will not be mirrored.

**Note**

This class is available only in Tessera Pro

Inheritance

Object
TesseraConstraint
MirrorConstraint

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class MirrorConstraint : TesseraConstraint
```

## Fields

### axis

Declaration

```
public MirrorConstraint.Axis axis
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| MirrorConstraint.Axis | |

### hasSymmetricTiles

If set, symmetricTilesX and symmetricTilesZ is used to determine symmetric tiles. Otherwise, they are automatically detected.

Declaration

```
public bool hasSymmetricTiles
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### symmetricTilesX

If hasSymmetricTiles, this set specifies tiles that look the same before and after x-reflection. If hasSymmetricTiles is not set, this list is automatically inferred by inspecting the tile's paint.

Declaration

```
public List<TesseraTileBase> symmetricTilesX
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| List<TesseraTileBase> | |

### symmetricTilesY

If hasSymmetricTiles, this set specifies tiles that look the same before and after y-reflection. If hasSymmetricTiles is not set, this list is automatically inferred by inspecting the tile's paint.

Declaration

```
public List<TesseraTileBase> symmetricTilesY
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| List<TesseraTileBase> | |

### symmetricTilesZ

If hasSymmetricTiles, this set specifies tiles that look the same before and after z-reflection. If hasSymmetricTiles is not set, this list is automatically inferred by inspecting the tile's paint.

Declaration

```
public List<TesseraTileBase> symmetricTilesZ
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| List<TesseraTileBase> | |

## Methods

### SetSymmetricTiles()

Declaration

```
public void SetSymmetricTiles()
```

# Enum MirrorConstraint.Axis

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public enum Axis
```

## Fields

| NAME | DESCRIPTION |
| --- | --- |
| W | |
| X | |
| Y | |
| Z | |

# Struct OrientedFace

Records the painted colors and location of single face of one cube in a TesseraTile

Inherited Members

ValueType.Equals(Object)
ValueType.GetHashCode()
ValueType.ToString()

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
[Serializable]
public struct OrientedFace
```

## Constructors

### OrientedFace(Vector3Int, CellFaceDir, FaceDetails)

Declaration

```
public OrientedFace(Vector3Int offset, CellFaceDir faceDir, FaceDetails faceDetails)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | offset | |
| CellFaceDir | faceDir | |
| FaceDetails | faceDetails | |

## Fields

### faceDetails

Declaration

```
public FaceDetails faceDetails
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| FaceDetails | |

### faceDir

Declaration

```
public CellFaceDir faceDir
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| CellFaceDir | |

### offset

Declaration

```
public Vector3Int offset
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3Int | |

## Methods

### Deconstruct(out Vector3Int, out CellFaceDir, out FaceDetails)

Declaration

```
public void Deconstruct(out Vector3Int offset, out CellFaceDir faceDir, out FaceDetails faceDetails)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | offset | |
| CellFaceDir | faceDir | |
| FaceDetails | faceDetails | |

# Class PaletteEntry

Inheritance

Object

PaletteEntry

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
[Serializable]
public class PaletteEntry
```

## Fields

### color

Declaration

```
public Color color
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Color | |

### name

Declaration

```
public string name
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| String | |

# Class PathConstraint

Forces a network of tiles to connect with each other, so there is always a complete path between them. Two tiles connect along the path if:

- Both tiles are in pathTiles (if hasPathTiles set); and
- The central color of the sides of the tiles leading to each other are in pathColors (if pathColors set)

**Note**

This class is available only in Tessera Pro

Inheritance

Object
TesseraConstraint
PathConstraint

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class PathConstraint : TesseraConstraint
```

## Fields

### hasPathColors

If set, pathColors is used to determine path tiles and sides.

Declaration

```
public bool hasPathColors
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### hasPathTiles

If set, pathColors is used to determine path tiles and sides.

Declaration

```
public bool hasPathTiles
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### pathColors

If hasPathColors, this set filters tiles that the path can connect through.

Declaration

```
public List<int> pathColors
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| List<Int32> | |

### pathTiles

If hasPathTiles, this set filters tiles that the path can connect through.

Declaration

```
public List<TesseraTileBase> pathTiles
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| List<TesseraTileBase> | |

### prioritize

If set, the the generator will prefer generating tiles near the path.

Declaration

```
public bool prioritize
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

# Enum PinType

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public enum PinType
```

## Fields

| NAME | DESCRIPTION |
| --- | --- |
| FacesAndInterior | The faces of the pinned tile are used to constrain the cells adjacent to the location of the pinned tile and the cells covered by the pin tile are masked out so no tiles will be generated in that location. |
| FacesOnly | The faces of the pinned tile are used to constrain the cells adjacent to the location of the pinned tile. |
| Pin | Forces generation the pinned tile at the location of the pin. |

# Class QuadInterpolation

Inheritance

Object

QuadInterpolation

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public static class QuadInterpolation
```

## Methods

### Interpolate(Vector2, Vector2, Vector2, Vector2)

Declaration

```
public static Func<Vector3, Vector2> Interpolate(Vector2 v1, Vector2 v2, Vector2 v3, Vector2 v4)
```

Parameters

| TYPE | NAME | DESCRIPTION |
|---|---|---|
| Vector2 | v1 | |
| Vector2 | v2 | |
| Vector2 | v3 | |
| Vector2 | v4 | |

Returns

| TYPE | DESCRIPTION |
|---|---|
| Func<Vector3, Vector2> | |

### Interpolate(Vector2, Vector2, Vector2, Vector2, Vector2, Vector2, Vector2, Vector2)

Declaration

```
public static Func<Vector3, Vector2> Interpolate(Vector2 v1, Vector2 v2, Vector2 v3, Vector2 v4, Vector2 v5,
Vector2 v6, Vector2 v7, Vector2 v8)
```

Parameters

| TYPE | NAME | DESCRIPTION |
|---|---|---|
| Vector2 | v1 | |
| Vector2 | v2 | |
| Vector2 | v3 | |
| Vector2 | v4 | |
| Vector2 | v5 | |

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector2 | v6 | |
| Vector2 | v7 | |
| Vector2 | v8 | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Func<Vector3, Vector2> | |

### Interpolate(Vector3, Vector3, Vector3, Vector3)

Declaration

```
public static Func<Vector3, Vector3> Interpolate(Vector3 v1, Vector3 v2, Vector3 v3, Vector3 v4)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3 | v1 | |
| Vector3 | v2 | |
| Vector3 | v3 | |
| Vector3 | v4 | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Func<Vector3, Vector3> | |

### Interpolate(Vector3, Vector3, Vector3, Vector3, Vector3, Vector3, Vector3, Vector3)

Declaration

```
public static Func<Vector3, Vector3> Interpolate(Vector3 v1, Vector3 v2, Vector3 v3, Vector3 v4, Vector3 v5,
Vector3 v6, Vector3 v7, Vector3 v8)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3 | v1 | |
| Vector3 | v2 | |
| Vector3 | v3 | |
| Vector3 | v4 | |

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3 | v5 | |
| Vector3 | v6 | |
| Vector3 | v7 | |
| Vector3 | v8 | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Func<Vector3, Vector3> | |

### Interpolate(Vector4, Vector4, Vector4, Vector4)

Declaration

```
public static Func<Vector3, Vector4> Interpolate(Vector4 v1, Vector4 v2, Vector4 v3, Vector4 v4)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector4 | v1 | |
| Vector4 | v2 | |
| Vector4 | v3 | |
| Vector4 | v4 | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Func<Vector3, Vector4> | |

### Interpolate(Vector4, Vector4, Vector4, Vector4, Vector4, Vector4, Vector4, Vector4)

Declaration

```
public static Func<Vector3, Vector4> Interpolate(Vector4 v1, Vector4 v2, Vector4 v3, Vector4 v4, Vector4 v5,
Vector4 v6, Vector4 v7, Vector4 v8)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector4 | v1 | |
| Vector4 | v2 | |
| Vector4 | v3 | |

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector4 | v4 | |
| Vector4 | v5 | |
| Vector4 | v6 | |
| Vector4 | v7 | |
| Vector4 | v8 | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Func<Vector3, Vector4> | |

### InterpolateNormal(MeshData, Int32, Int32)

Declaration

```
public static Func<Vector3, Vector3> InterpolateNormal(MeshData mesh, int submesh, int face)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| MeshData | mesh | |
| Int32 | submesh | |
| Int32 | face | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Func<Vector3, Vector3> | |

### InterpolatePosition(MeshData, Int32, Int32, Single, Single)

Sets up a function that does trilinear interpolation from a unit cube centered on the origin to a cube made by extruding a given face of the mesh by meshOffset1 (for y=-0.5) and meshOffset2 (for y=0.5)

Declaration

```
public static Func<Vector3, Vector3> InterpolatePosition(MeshData mesh, int submesh, int face, float
meshOffset1, float meshOffset2)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| MeshData | mesh | |
| Int32 | submesh | |

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Int32 | face | |
| Single | meshOffset1 | |
| Single | meshOffset2 | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Func<Vector3, Vector3> | |

### InterpolateTangent(MeshData, Int32, Int32)

Declaration

```
public static Func<Vector3, Vector4> InterpolateTangent(MeshData mesh, int submesh, int face)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| MeshData | mesh | |
| Int32 | submesh | |
| Int32 | face | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Func<Vector3, Vector4> | |

### InterpolateUv(MeshData, Int32, Int32)

Declaration

```
public static Func<Vector3, Vector2> InterpolateUv(MeshData mesh, int submesh, int face)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| MeshData | mesh | |
| Int32 | submesh | |
| Int32 | face | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Func<Vector3, Vector2> | |

# Enum RotationGroupType

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public enum RotationGroupType
```

## Fields

| NAME | DESCRIPTION |
| --- | --- |
| All | |
| None | |
| XY | |
| XZ | |
| YZ | |

# Class SeparationConstraint

Inheritance

Object

TesseraConstraint

SeparationConstraint

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class SeparationConstraint : TesseraConstraint
```

## Fields

### minDistance

The count to be compared against.

Declaration

```
public int minDistance
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### tiles

The set of tiles to count

Declaration

```
public List<TesseraTileBase> tiles
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| List<TesseraTileBase> | |

# Class TesseraCompletion

Returned by TesseraGenerator after generation finishes

Inheritance

Object

TesseraCompletion

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class TesseraCompletion
```

## Properties

### backtrackCount

The number of times the generation process backtracked.

Declaration

```
public int backtrackCount { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### contradictionLocation

If success is false, indicates where the generation failed.

Declaration

```
public Vector3Int? contradictionLocation { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Nullable<Vector3Int> | |

### grid

Gives details about the cells.

Declaration

```
public IGrid grid { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| IGrid | |

### isIncremental

Indicates these instances should be added to the previous set of instances.

Declaration

```
public bool isIncremental { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### retries

The number of times the generation process was restarted.

Declaration

```
public int retries { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### success

True if all tiles were successfully found.

Declaration

```
public bool success { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### tileInstances

The list of tiles to create.

Declaration

```
public IList<TesseraTileInstance> tileInstances { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| IList<TesseraTileInstance> | |

# Class TesseraConstraint

Abstract class for all generator constraint components.

**Note**

This class is available only in Tessera Pro

Inheritance

Object
TesseraConstraint
CountConstraint
MirrorConstraint
PathConstraint
SeparationConstraint

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public abstract class TesseraConstraint : MonoBehaviour
```

# Class TesseraGenerateOptions

Additional settings to customize the generation at runtime.

Inheritance

Object

TesseraGenerateOptions

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class TesseraGenerateOptions
```

## Fields

### cancellationToken

Allows interuption of the calculations

Declaration

```
public CancellationToken cancellationToken
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| CancellationToken | |

### initialConstraints

If sets, overrides TesseraGenerator.initialConstraints and TesseraGenerator.searchInitialConstraints.

Declaration

```
public List<ITesseraInitialConstraint> initialConstraints
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| List<ITesseraInitialConstraint> | |

### onComplete

Called when the generation is complete. By default, checks for success then invokes onCreate on each instance.

Declaration

```
public Action<TesseraCompletion> onComplete
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Action<TesseraCompletion> | |

### onCreate

Called for each newly generated tile. By default, Instantiate(TesseraTileInstance, Transform) is used.

Declaration

```
public Action<TesseraTileInstance> onCreate
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Action<TesseraTileInstance> | |

### progress

Called with a string describing the current phase of the calculations, and the progress from 0 to 1. Progress can move backwards for retries or backtracing. Note progress can be called from threads other than the main thread.

Declaration

```
public Action<string, float> progress
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Action<String, Single> | |

## Properties

### multithreaded

If set, then generation is offloaded to another thread stopping Unity from freezing. Requires you to use StartGenerate in a coroutine. Multithreaded is ignored in the WebGL player, as it doesn't support threads.

Declaration

```
public bool multithreaded { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### seed

Fixes the seed for random number generator. If the value is zero, the seed is taken from Unity.Random

Declaration

```
public int seed { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

# Class TesseraGenerator

GameObjects with this behaviour contain utilities to generate tile based levels using Wave Function Collapse (WFC). Call Generate(TesseraGenerateOptions) or StartGenerate(TesseraGenerateOptions) to run. The generation takes the following steps:

- Inspect the tiles in tiles and work out how they rotate and connect to each other.
- Setup any initial constraints that fix parts of the generation (initialConstraints).
- Fix the boundary of the generation if skyBox is set.
- Generate a set of tile instances that fits the above tiles and constraints.
- Optionally retries or backtrack.
- Instantiates the tile instances.

Inheritance

Object

TesseraGenerator

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class TesseraGenerator : MonoBehaviour
```

## Fields

### backtrack

If set, backtracking will be used during generation. Backtracking can find solutions that would otherwise be failures, but can take a long time.

Declaration

```
public bool backtrack
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### filterSurfaceSubmeshTiles

If true, and a surfaceMesh is set with multiple submeshes (materials), then use surfaceSubmeshTiles.

Declaration

```
public bool filterSurfaceSubmeshTiles
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### retries

If backtracking is off, how many times to retry generation if a solution cannot be found.

Declaration

```
public int retries
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### searchInitialConstraints

If true, then active tiles in the scene will be taken as initial constraints. If false, then no initial constraints are used. Using initialConstraints overrides either outcome.

Declaration

```
public bool searchInitialConstraints
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### skyBox

If set, this tile is used to define extra initial constraints for the boundary.

Declaration

```
public TesseraTileBase skyBox
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| TesseraTileBase | |

### surfaceMesh

If set, then tiles are generated on the surface of this mesh instead of a regular grid.

Declaration

```
public Mesh surfaceMesh
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Mesh | |

### surfaceOffset

Height above the surface mesh that the bottom layer of tiles is generated at.

Declaration

```
public float surfaceOffset
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Single | |

### surfaceSmoothNormals

Controls how normals are treated for meshes deformed to fit the surfaceMesh.

Declaration

```
public bool surfaceSmoothNormals
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### surfaceSubmeshTiles

A list of tiles to filter each submesh of surfaceMesh to. Ignored unless filterSurfaceSubmeshTiles is true.

Declaration

```
public List<TileList> surfaceSubmeshTiles
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| List<TileList> | |

### tiles

The list of tiles eligable for generation.

Declaration

```
public List<TileEntry> tiles
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| List<TileEntry> | |

### tileSize

The stride between each cell in the generation. "big" tiles may occupy a multiple of this tile size.

Declaration

```
public Vector3 tileSize
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

## Properties

### bounds

The area of generation. Setting this will cause the size to be rounded to a multiple of tileSize

Declaration

```
public Bounds bounds { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Bounds | |

### CellType

Indicates the cell type of the tiles set up.

Declaration

```
public ICellType CellType { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| ICellType | |

### center

The local position of the center of the area to generate.

Declaration

```
public Vector3 center { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

### origin

Declaration

```
public Vector3 origin { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

### palette

Inherited from the first tile in tiles.

Declaration

```
public TesseraPalette palette { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| TesseraPalette | |

### size

The size of the generator area, counting in cells each of size tileSize.

Declaration

```
public Vector3Int size { get; set; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3Int | |

## Methods

### Clear()

Clear's previously generated content.

Declaration

```
public void Clear()
```

### Generate(TesseraGenerateOptions)

Synchronously runs the generation process described in the class docs.

Declaration

```
public TesseraCompletion Generate(TesseraGenerateOptions options = null)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TesseraGenerateOptions | options | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| TesseraCompletion | |

### GetCellTypes()

For validation purposes

Declaration

```
public IList<ICellType> GetCellTypes()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IList<ICellType> | |

### GetInitialConstraintBuilder()

Declaration

```
public TesseraInitialConstraintBuilder GetInitialConstraintBuilder()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| TesseraInitialConstraintBuilder | |

### GetMissizedTiles()

For validation purposes

Declaration

```
public IEnumerable<TesseraTileBase> GetMissizedTiles()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IEnumerable<TesseraTileBase> | |

### Instantiate(TesseraTileInstance, Transform)

Utility function that instantiates a tile instance in the scene. This is the default function used when you do not pass `onCreate` to the Generate method. It is essentially the same as Unity's normal Instantiate method with extra features:

- respects instantiateChildrenOnly
- applies mesh transformations (Pro only)

Declaration

```
public static GameObject[] Instantiate(TesseraTileInstance instance, Transform parent)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TesseraTileInstance | instance | The instance being created. |
| Transform | parent | The game object to parent the new game object to. This does not affect the world position of the instance |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| | |

| TYPE | DESCRIPTION |
| --- | --- |
| GameObject[] | The game objects created. |

### Regenerate(TesseraGenerateOptions)

Runs Clear, then Generate

Declaration

```
public TesseraCompletion Regenerate(TesseraGenerateOptions options = null)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TesseraGenerateOptions | options | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| TesseraCompletion | |

### StartGenerate(TesseraGenerateOptions)

Asynchronously runs the generation process described in the class docs, for use with StartCoroutine.

Declaration

```
public EnumeratorWithResult<TesseraCompletion> StartGenerate(TesseraGenerateOptions options = null)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TesseraGenerateOptions | options | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| EnumeratorWithResult<TesseraCompletion> | |

Remarks

The default instantiation is still synchronous, so this can still cause frame glitches unless you override onCreate.

# Class TesseraHexTile

GameObjects with this behaviour record adjacency information for use with a TesseraGenerator.

Inheritance

Object
TesseraTileBase
TesseraHexTile

Inherited Members

TesseraTileBase.palette
TesseraTileBase.faceDetails
TesseraTileBase.offsets
TesseraTileBase.center
TesseraTileBase.tileSize
TesseraTileBase.rotatable
TesseraTileBase.reflectable
TesseraTileBase.rotationGroupType
TesseraTileBase.instantiateChildrenOnly
TesseraTileBase.Get(Vector3Int, CellFaceDir)
TesseraTileBase.TryGet(Vector3Int, CellFaceDir, FaceDetails)

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class TesseraHexTile : TesseraTileBase
```

## Constructors

### TesseraHexTile()

Declaration

```
public TesseraHexTile()
```

## Properties

### CellType

Declaration

```
public override ICellType CellType { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| ICellType | |

Overrides

TesseraTileBase.CellType

## Methods

### AddOffset(Vector3Int)

Configures the tile as a "big" tile that occupies several cells. Keeps offsets and faceDetails in sync.

Declaration

```
public override void AddOffset(Vector3Int o)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | o | |

Overrides

TesseraTileBase.AddOffset(Vector3Int)

### GetBounds()

Declaration

```
public BoundsInt GetBounds()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| BoundsInt | |

### RemoveOffset(Vector3Int)

Configures the tile as a "big" tile that occupies several cells. Keeps offsets and faceDetails in sync.

Declaration

```
public override void RemoveOffset(Vector3Int o)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | o | |

Overrides

TesseraTileBase.RemoveOffset(Vector3Int)

# Class TesseraInitialConstraint

Initial constraint objects fix parts of the generation process in places. Use the utility methods on TesseraGenerator to create these objects.

Inheritance

Object

TesseraInitialConstraint

Implements

ITesseraInitialConstraint

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
[Serializable]
public class TesseraInitialConstraint : ITesseraInitialConstraint
```

## Properties

### Name

Declaration

```
public string Name { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| String | |

## Implements

ITesseraInitialConstraint

# Class TesseraInitialConstraintBuilder

Inheritance

Object

TesseraInitialConstraintBuilder

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class TesseraInitialConstraintBuilder
```

## Methods

### GetInitialConstraint(GameObject)

Gets the initial constraint for a given game object. It checks for a TesseraPinned, TesseraTile or TesseraVolume component.

Declaration

```
public ITesseraInitialConstraint GetInitialConstraint(GameObject gameObject)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| GameObject | gameObject | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| ITesseraInitialConstraint | |

### GetInitialConstraint(TesseraPinned)

Gets the initial constraint from a given pin at a given position. It should be aligned with the grid defined by this generator.

Declaration

```
public ITesseraInitialConstraint GetInitialConstraint(TesseraPinned pin)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TesseraPinned | pin | The pin to inspect |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| ITesseraInitialConstraint | |

### GetInitialConstraint(TesseraPinned, Matrix4x4)

Gets the initial constraint from a given pin at a given position. It should be aligned with the grid defined by this generator.

Declaration

```
public ITesseraInitialConstraint GetInitialConstraint(TesseraPinned pin, Matrix4x4 localToWorldMatrix)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TesseraPinned | pin | The pin to inspect |
| Matrix4x4 | localToWorldMatrix | The matrix indicating the position and rotation of the tile |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| ITesseraInitialConstraint | |

### GetInitialConstraint(TesseraTileBase)

Gets the initial constraint from a given tile. The tile should be aligned with the grid defined by this generator.

Declaration

```
public TesseraInitialConstraint GetInitialConstraint(TesseraTileBase tile)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TesseraTileBase | tile | The tile to inspect |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| TesseraInitialConstraint | |

### GetInitialConstraint(TesseraTileBase, Matrix4x4)

Gets the initial constraint from a given tile at a given position. The tile should be aligned with the grid defined by this generator.

Declaration

```
public TesseraInitialConstraint GetInitialConstraint(TesseraTileBase tile, Matrix4x4 localToWorldMatrix)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TesseraTileBase | tile | The tile to inspect |
| Matrix4x4 | localToWorldMatrix | The matrix indicating the position and rotation of the tile |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| TesseraInitialConstraint | |

### GetInitialConstraint(TesseraTileInstance, PinType)

Converts a TesseraTileInstance to a ITesseraInitialConstraint. This allows you to easily use the output of one generation for later generations

Declaration

```
public ITesseraInitialConstraint GetInitialConstraint(TesseraTileInstance tileInstance, PinType pinType =
PinType.Pin)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TesseraTileInstance | tileInstance | |
| PinType | pinType | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| ITesseraInitialConstraint | |

### GetInitialConstraint(TesseraVolume)

Gets the initial constraint from a given tile. The tile should be aligned with the grid defined by this generator.

Declaration

```
public TesseraVolumeFilter GetInitialConstraint(TesseraVolume volume)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TesseraVolume | volume | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| TesseraVolumeFilter | |

### SearchInitialConstraints()

Searches the scene for all applicable game objects and converts them to ITesseraInitialConstraint

Declaration

```
public List<ITesseraInitialConstraint> SearchInitialConstraints()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| List<ITesseraInitialConstraint> | |

# Class TesseraMeshOutput

Attach this to a TesseraGenerator to output the tiles to a single mesh instead of instantiating them.

**Note**

This class is available only in Tessera Pro

Inheritance

Object

TesseraMeshOutput

Implements

ITesseraTileOutput

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class TesseraMeshOutput : MonoBehaviour, ITesseraTileOutput
```

## Fields

### targetMeshFilter

Declaration

```
public MeshFilter targetMeshFilter
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| MeshFilter | |

## Properties

### IsEmpty

Declaration

```
public bool IsEmpty { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### SupportsIncremental

Declaration

```
public bool SupportsIncremental { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

## Methods

## ClearTiles()

Declaration

```
public void ClearTiles()
```

## UpdateTiles(TesseraCompletion)

Declaration

```
public void UpdateTiles(TesseraCompletion completion)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TesseraCompletion | completion | |

## Implements

ITesseraTileOutput

# Class TesseraPalette

Inheritance

Object

TesseraPalette

Implements

ISerializationCallbackReceiver

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class TesseraPalette : ScriptableObject, ISerializationCallbackReceiver
```

## Constructors

### TesseraPalette()

Declaration

```
public TesseraPalette()
```

## Fields

### entries

Declaration

```
public List<PaletteEntry> entries
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| List<PaletteEntry> | |

### matchOverrides

Declaration

```
public Dictionary<(int, int), bool> matchOverrides
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Dictionary<ValueTuple<Int32, Int32>, Boolean> | |

## Properties

### defaultPalette

Declaration

```
public static TesseraPalette defaultPalette { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| TesseraPalette | |

### entryCount

Declaration

```
public int entryCount { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

## Methods

### GetColor(Int32)

Declaration

```
public Color GetColor(int i)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Int32 | i | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Color | |

### GetEntry(Int32)

Declaration

```
public PaletteEntry GetEntry(int i)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Int32 | i | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| PaletteEntry | |

### Match(Int32, Int32)

Declaration

```
public bool Match(int a, int b)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Int32 | a | |

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Int32 | b | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### Match(FaceDetails, FaceDetails)

Declaration

```
public bool Match(FaceDetails a, FaceDetails b)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| FaceDetails | a | |
| FaceDetails | b | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### OnAfterDeserialize()

Declaration

```
public void OnAfterDeserialize()
```

### OnBeforeSerialize()

Declaration

```
public void OnBeforeSerialize()
```

### Implements

ISerializationCallbackReceiver

# Class TesseraPinConstraint

Inheritance

Object

TesseraPinConstraint

Implements

ITesseraInitialConstraint

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class TesseraPinConstraint : ITesseraInitialConstraint
```

## Properties

### Name

Declaration

```
public string Name { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| String | |

## Implements

ITesseraInitialConstraint

# Class TesseraPinned

Inheritance

Object

TesseraPinned

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class TesseraPinned : MonoBehaviour
```

## Fields

### pinType

Sets the type of pin to apply.

Declaration

```
public PinType pinType
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| PinType | |

### tile

The tile to pin. Defaults to a tile component found on the same GameObject

Declaration

```
public TesseraTile tile
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| TesseraTile | |

# Class TesseraTile

GameObjects with this behaviour record adjacency information for use with a TesseraGenerator.

Inheritance

Object
TesseraTileBase
TesseraTile

Inherited Members

TesseraTileBase.palette
TesseraTileBase.faceDetails
TesseraTileBase.offsets
TesseraTileBase.center
TesseraTileBase.tileSize
TesseraTileBase.rotatable
TesseraTileBase.reflectable
TesseraTileBase.rotationGroupType
TesseraTileBase.instantiateChildrenOnly
TesseraTileBase.Get(Vector3Int, CellFaceDir)
TesseraTileBase.TryGet(Vector3Int, CellFaceDir, FaceDetails)

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class TesseraTile : TesseraTileBase
```

## Constructors

### TesseraTile()

Declaration

```
public TesseraTile()
```

## Properties

### CellType

Declaration

```
public override ICellType CellType { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| ICellType | |

Overrides

TesseraTileBase.CellType

## Methods

### AddOffset(Vector3Int)

Configures the tile as a "big" tile that occupies several cells. Keeps offsets and faceDetails in sync.

Declaration

```
public override void AddOffset(Vector3Int o)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | o | |

Overrides

TesseraTileBase.AddOffset(Vector3Int)

### GetBounds()

Declaration

```
public BoundsInt GetBounds()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| BoundsInt | |

### RemoveOffset(Vector3Int)

Configures the tile as a "big" tile that occupies several cells. Keeps offsets and faceDetails in sync.

Declaration

```
public override void RemoveOffset(Vector3Int o)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | o | |

Overrides

TesseraTileBase.RemoveOffset(Vector3Int)

# Class TesseraTileBase

Inheritance

Object

TesseraTileBase

TesseraHexTile

TesseraTile

TesseraTrianglePrismTile

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public abstract class TesseraTileBase : MonoBehaviour
```

## Fields

### center

Where the center of tile is. For big tils that occupy more than one cell, it's the center of the cell with offset (0, 0, 0).

Declaration

```
public Vector3 center
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

### faceDetails

A list of outward facing faces. For a normal cube tile, there are 6 faces. Each face contains adjacency information that indicates what other tiles can connect to it. It is recommended you only edit this via the Unity Editor, or Get(Vector3Int, CellFaceDir) and AddOffset(Vector3Int)

Declaration

```
public List<OrientedFace> faceDetails
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| List<OrientedFace> | |

### instantiateChildrenOnly

If set, when being instantiated by a Generator, only children will get constructed. If there are no children, then this effectively disables the tile from instantiation.

Declaration

```
public bool instantiateChildrenOnly
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### offsets

A list of cells that this tile occupies. For a normal cube tile, this just contains Vector3Int.zero, but it will be more for "big" tiles. It is recommended you only edit this via the Unity Editor, or AddOffset(Vector3Int) and RemoveOffset(Vector3Int)

Declaration

```
public List<Vector3Int> offsets
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| List<Vector3Int> | |

### palette

Set this to control the colors and names used for painting on the tile. Defaults to defaultPalette.

Declaration

```
public TesseraPalette palette
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| TesseraPalette | |

### reflectable

If true, when generating, reflections in the x-axis will be used.

Declaration

```
public bool reflectable
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### rotatable

If true, when generating, rotations of the tile will be used.

Declaration

```
public bool rotatable
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

| TYPE | DESCRIPTION |
| --- | --- |
| | |

### rotationGroupType

If rotatable is on, specifies what sorts of rotations are used.

Declaration

```
public RotationGroupType rotationGroupType
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| RotationGroupType | |

### tileSize

The size of one cell in the tile. NB: This field is only used in the Editor - you must set tileSize to match.

Declaration

```
public Vector3 tileSize
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

## Properties

### CellType

Declaration

```
public abstract ICellType CellType { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| ICellType | |

## Methods

### AddOffset(Vector3Int)

Configures the tile as a "big" tile that occupies several cells. Keeps offsets and faceDetails in sync.

Declaration

```
public abstract void AddOffset(Vector3Int o)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| | | |

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | o | |

### Get(Vector3Int, CellFaceDir)

Finds the face details for a cell with a given offeset.

Declaration

```
public FaceDetails Get(Vector3Int offset, CellFaceDir faceDir)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | offset | |
| CellFaceDir | faceDir | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| FaceDetails | |

### RemoveOffset(Vector3Int)

Configures the tile as a "big" tile that occupies several cells. Keeps offsets and faceDetails in sync.

Declaration

```
public abstract void RemoveOffset(Vector3Int o)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | o | |

### TryGet(Vector3Int, CellFaceDir, out FaceDetails)

Finds the face details for a cell with a given offeset.

Declaration

```
public bool TryGet(Vector3Int offset, CellFaceDir faceDir, out FaceDetails details)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | offset | |
| CellFaceDir | faceDir | |
| FaceDetails | details | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

# Class TesseraTileInstance

Represents a request to instantiate a TesseraTile, post generation.

Inheritance

Object

TesseraTileInstance

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class TesseraTileInstance
```

## Properties

### Cell

Declaration

```
public Vector3Int Cell { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3Int | |

### CellRotation

Declaration

```
public CellRotation CellRotation { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| CellRotation | |

### CellRotations

Declaration

```
public CellRotation[] CellRotations { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| CellRotation[] | |

### Cells

Declaration

```
public Vector3Int[] Cells { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3Int[] | |

### LocalPosition

Declaration

```
public Vector3 LocalPosition { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

### LocalRotation

Declaration

```
public Quaternion LocalRotation { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Quaternion | |

### LocalScale

Declaration

```
public Vector3 LocalScale { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

### LossyScale

Declaration

```
public Vector3 LossyScale { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

### MeshDeformation

Declaration

```
public MeshDeformation MeshDeformation { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| MeshDeformation | |

### Position

Declaration

```
public Vector3 Position { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

### Rotation

Declaration

```
public Quaternion Rotation { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Quaternion | |

### Tile

Declaration

```
public TesseraTileBase Tile { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| TesseraTileBase | |

# Class TesseraTilemapOutput

Attach this to a TesseraGenerator to output the tiles to a Unity Tilemap component instead of directly instantiating them.

**Note**

This class is available only in Tessera Pro

Inheritance

Object

TesseraTilemapOutput

Implements

ITesseraTileOutput

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class TesseraTilemapOutput : MonoBehaviour, ITesseraTileOutput
```

## Fields

### tilemap

The tilemap to write results to.

Declaration

```
public Tilemap tilemap
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Tilemap | |

### useSprites

If true, TesseraTiles that have a SpriteRenderer will be recorded to the Tilemap as that sprite. This is more efficient, but you will lose any other components on the object.

Declaration

```
public bool useSprites
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### useWorld

If true, tiles will be transformed to align with the world space position of the generator.

Declaration

```
public bool useWorld
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

## Properties

### IsEmpty

Declaration

```
public bool IsEmpty { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### SupportsIncremental

Declaration

```
public bool SupportsIncremental { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

## Methods

### ClearTiles()

Declaration

```
public void ClearTiles()
```

### UpdateTiles(TesseraCompletion)

Declaration

```
public void UpdateTiles(TesseraCompletion completion)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TesseraCompletion | completion | |

## Implements

ITesseraTileOutput

# Class TesseraTransformedTile

Definesa Unity tile that has a specific transform applied to it. Used by TesseraTilemapOutput

Inheritance

Object

TesseraTransformedTile

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class TesseraTransformedTile : Tile
```

## Fields

### localScale

Declaration

```
public Vector3 localScale
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

### position

Declaration

```
public Vector3 position
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

### rotation

Declaration

```
public Quaternion rotation
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Quaternion | |

### useWorld

Declaration

```
public bool useWorld
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

## Methods

### StartUp(Vector3Int, ITilemap, GameObject)

Declaration

```
public override bool StartUp(Vector3Int position, ITilemap tilemap, GameObject go)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | position | |
| ITilemap | tilemap | |
| GameObject | go | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

# Class TesseraTrianglePrismTile

GameObjects with this behaviour record adjacency information for use with a TesseraGenerator.

Inheritance

Object
TesseraTileBase
TesseraTrianglePrismTile

Inherited Members

TesseraTileBase.palette
TesseraTileBase.faceDetails
TesseraTileBase.offsets
TesseraTileBase.center
TesseraTileBase.tileSize
TesseraTileBase.rotatable
TesseraTileBase.reflectable
TesseraTileBase.rotationGroupType
TesseraTileBase.instantiateChildrenOnly
TesseraTileBase.Get(Vector3Int, CellFaceDir)
TesseraTileBase.TryGet(Vector3Int, CellFaceDir, FaceDetails)

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class TesseraTrianglePrismTile : TesseraTileBase
```

## Constructors

### TesseraTrianglePrismTile()

Declaration

```
public TesseraTrianglePrismTile()
```

## Properties

### CellType

Declaration

```
public override ICellType CellType { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| ICellType | |

Overrides

TesseraTileBase.CellType

## Methods

### AddOffset(Vector3Int)

Configures the tile as a "big" tile that occupies several cells. Keeps offsets and faceDetails in sync.

Declaration

```
public override void AddOffset(Vector3Int o)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | o | |

Overrides

TesseraTileBase.AddOffset(Vector3Int)

### GetBounds()

Declaration

```
public BoundsInt GetBounds()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| BoundsInt | |

### RemoveOffset(Vector3Int)

Configures the tile as a "big" tile that occupies several cells. Keeps offsets and faceDetails in sync.

Declaration

```
public override void RemoveOffset(Vector3Int o)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | o | |

Overrides

TesseraTileBase.RemoveOffset(Vector3Int)

# Class TesseraVolume

Inheritance

Object

TesseraVolume

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class TesseraVolume : MonoBehaviour
```

## Fields

### generator

No effect on behaviour, setting this improves the UI in the Unity inspector.

Declaration

```
public TesseraGenerator generator
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| TesseraGenerator | |

### invertArea

If false, affect all cells inside the volume's colliders. If true, affect all cells outside.

Declaration

```
public bool invertArea
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### tiles

The list of tiles to filter on.

Declaration

```
public List<TesseraTileBase> tiles
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| List<TesseraTileBase> | |

### volumeType

Controls the behaviour of this volume

Declaration

```
public VolumeType volumeType
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| VolumeType | |

# Class TesseraVolumeFilter

Inheritance

Object

TesseraVolumeFilter

Implements

ITesseraInitialConstraint

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class TesseraVolumeFilter : ITesseraInitialConstraint
```

## Fields

### volumeType

Declaration

```
public VolumeType volumeType
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| VolumeType | |

## Properties

### Name

Declaration

```
public string Name { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| String | |

## Implements

ITesseraInitialConstraint

# Class TileEntry

Specifies a tile to be used by TesseraGenerator

Inheritance

Object

TileEntry

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
[Serializable]
public class TileEntry
```

## Fields

### tile

The tile to use

Declaration

```
public TesseraTileBase tile
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| TesseraTileBase | |

### weight

The weight controls the relative probability of this tile being selected. I.e. tile wiht weight of 2.0 is twice common in the generation than a tile with weight 1.0.

Declaration

```
public float weight
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| Single | |

# Class TileList

Inheritance

Object

TileList

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
[Serializable]
public class TileList
```

## Fields

### tiles

Declaration

```
public List<TesseraTileBase> tiles
```

Field Value

| TYPE | DESCRIPTION |
| --- | --- |
| List<TesseraTileBase> | |

# Class TriangleInterpolation

Inheritance

Object

TriangleInterpolation

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public static class TriangleInterpolation
```

## Methods

### Interpolate(Vector2, Vector2, Vector2)

Declaration

```
public static Func<Vector3, Vector2> Interpolate(Vector2 v1, Vector2 v2, Vector2 v3)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector2 | v1 | |
| Vector2 | v2 | |
| Vector2 | v3 | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Func<Vector3, Vector2> | |

### Interpolate(Vector2, Vector2, Vector2, Vector2, Vector2, Vector2)

Declaration

```
public static Func<Vector3, Vector2> Interpolate(Vector2 v1, Vector2 v2, Vector2 v3, Vector2 v4, Vector2 v5,
Vector2 v6)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector2 | v1 | |
| Vector2 | v2 | |
| Vector2 | v3 | |
| Vector2 | v4 | |
| Vector2 | v5 | |
| Vector2 | v6 | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Func<Vector3, Vector2> | |

### Interpolate(Vector3, Vector3, Vector3)

Declaration

```
public static Func<Vector3, Vector3> Interpolate(Vector3 v1, Vector3 v2, Vector3 v3)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3 | v1 | |
| Vector3 | v2 | |
| Vector3 | v3 | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Func<Vector3, Vector3> | |

### Interpolate(Vector3, Vector3, Vector3, Vector3, Vector3, Vector3)

Declaration

```
public static Func<Vector3, Vector3> Interpolate(Vector3 v1, Vector3 v2, Vector3 v3, Vector3 v4, Vector3 v5,
Vector3 v6)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3 | v1 | |
| Vector3 | v2 | |
| Vector3 | v3 | |
| Vector3 | v4 | |
| Vector3 | v5 | |
| Vector3 | v6 | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Func<Vector3, Vector3> | |

### Interpolate(Vector4, Vector4, Vector4)

Declaration

```
public static Func<Vector3, Vector4> Interpolate(Vector4 v1, Vector4 v2, Vector4 v3)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector4 | v1 | |
| Vector4 | v2 | |
| Vector4 | v3 | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Func<Vector3, Vector4> | |

### Interpolate(Vector4, Vector4, Vector4, Vector4, Vector4, Vector4)

Declaration

```
public static Func<Vector3, Vector4> Interpolate(Vector4 v1, Vector4 v2, Vector4 v3, Vector4 v4, Vector4 v5,
Vector4 v6)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector4 | v1 | |
| Vector4 | v2 | |
| Vector4 | v3 | |
| Vector4 | v4 | |
| Vector4 | v5 | |
| Vector4 | v6 | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Func<Vector3, Vector4> | |

### InterpolateNormal(MeshData, Int32, Int32)

Declaration

```
public static Func<Vector3, Vector3> InterpolateNormal(MeshData mesh, int submesh, int face)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| MeshData | mesh | |
| Int32 | submesh | |
| Int32 | face | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Func<Vector3, Vector3> | |

### InterpolatePosition(MeshData, Int32, Int32, Single, Single)

Declaration

```
public static Func<Vector3, Vector3> InterpolatePosition(MeshData mesh, int submesh, int face, float
meshOffset1, float meshOffset2)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| MeshData | mesh | |
| Int32 | submesh | |
| Int32 | face | |
| Single | meshOffset1 | |
| Single | meshOffset2 | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Func<Vector3, Vector3> | |

### InterpolateTangent(MeshData, Int32, Int32)

Declaration

```
public static Func<Vector3, Vector4> InterpolateTangent(MeshData mesh, int submesh, int face)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| MeshData | mesh | |
| Int32 | submesh | |
| Int32 | face | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Func<Vector3, Vector4> | |

### InterpolateUv(MeshData, Int32, Int32)

Declaration

```
public static Func<Vector3, Vector2> InterpolateUv(MeshData mesh, int submesh, int face)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| MeshData | mesh | |
| Int32 | submesh | |
| Int32 | face | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Func<Vector3, Vector2> | |

# Class TrianglePrismCellType

Note

This class is available only in Tessera Pro

Inheritance

Object

TrianglePrismCellType

Implements

ICellType

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class TrianglePrismCellType : ICellType
```

## Properties

### Instance

Declaration

```
public static TrianglePrismCellType Instance { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| TrianglePrismCellType | |

## Methods

### FindPath(Vector3Int, Vector3Int)

Declaration

```
public IEnumerable<CellFaceDir> FindPath(Vector3Int startOffset, Vector3Int endOffset)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | startOffset | |
| Vector3Int | endOffset | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IEnumerable<CellFaceDir> | |

### GetCellCenter(Vector3Int, Vector3, Vector3)

Declaration

```
public Vector3 GetCellCenter(Vector3Int offset, Vector3 center, Vector3 tileSize)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | offset | |
| Vector3 | center | |
| Vector3 | tileSize | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

### GetFaceDirPairs()

Declaration

```
public IEnumerable<(CellFaceDir, CellFaceDir)> GetFaceDirPairs()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IEnumerable<ValueTuple<CellFaceDir, CellFaceDir>> | |

### GetFaceDirs()

Declaration

```
public IEnumerable<CellFaceDir> GetFaceDirs()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IEnumerable<CellFaceDir> | |

### GetIdentity()

Declaration

```
public CellRotation GetIdentity()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellRotation | |

### GetMatrix(CellRotation)

Declaration

```
public Matrix4x4 GetMatrix(CellRotation rotation)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellRotation | rotation | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Matrix4x4 | |

### GetRotations(Boolean, Boolean, RotationGroupType)

Declaration

```
public IList<CellRotation> GetRotations(bool rotatable = true, bool reflectable = true, RotationGroupType
rotationGroupType = RotationGroupType.All)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Boolean | rotatable | |
| Boolean | reflectable | |
| RotationGroupType | rotationGroupType | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| IList<CellRotation> | |

### Invert(CellFaceDir)

Declaration

```
public CellFaceDir Invert(CellFaceDir faceDir)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellFaceDir | faceDir | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellFaceDir | |

### Invert(CellRotation)

Declaration

```
public CellRotation Invert(CellRotation a)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellRotation | a | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellRotation | |

### Multiply(CellRotation, CellRotation)

Declaration

```
public CellRotation Multiply(CellRotation a, CellRotation b)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellRotation | a | |
| CellRotation | b | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellRotation | |

### Rotate(CellFaceDir, CellRotation)

Declaration

```
public CellFaceDir Rotate(CellFaceDir faceDir, CellRotation rotation)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellFaceDir | faceDir | |
| CellRotation | rotation | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellFaceDir | |

### RotateBy(CellFaceDir, FaceDetails, CellRotation)

Declaration

```
public (CellFaceDir, FaceDetails) RotateBy(CellFaceDir faceDir, FaceDetails faceDetails, CellRotation
rotation)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellFaceDir | faceDir | |
| FaceDetails | faceDetails | |
| CellRotation | rotation | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| ValueTuple<CellFaceDir, FaceDetails> | |

### TryMove(Vector3Int, CellFaceDir, out Vector3Int)

Declaration

```
public bool TryMove(Vector3Int offset, CellFaceDir dir, out Vector3Int dest)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | offset | |
| CellFaceDir | dir | |
| Vector3Int | dest | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

## Implements

ICellType

# Enum TrianglePrismFaceDir

Note

This class is available only in Tessera Pro

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public enum TrianglePrismFaceDir
```

## Fields

| NAME | DESCRIPTION |
| --- | --- |
| Back | |
| BackLeft | |
| BackRight | |
| Down | |
| Forward | |
| ForwardLeft | |
| ForwardRight | |
| Up | |

# Class TrianglePrismFaceDirExtensions

Note

This class is available only in Tessera Pro

Inheritance

Object

TrianglePrismFaceDirExtensions

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public static class TrianglePrismFaceDirExtensions
```

## Methods

### Forward(TrianglePrismFaceDir)

Declaration

```
public static Vector3 Forward(this TrianglePrismFaceDir dir)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TrianglePrismFaceDir | dir | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

### GetSide(TrianglePrismFaceDir)

Declaration

```
public static int GetSide(this TrianglePrismFaceDir dir)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TrianglePrismFaceDir | dir | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### IsUpDown(TrianglePrismFaceDir)

Declaration

```
public static bool IsUpDown(this TrianglePrismFaceDir dir)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TrianglePrismFaceDir | dir | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### IsValid(TrianglePrismFaceDir, Boolean)

Declaration

```
public static bool IsValid(this TrianglePrismFaceDir dir, bool pointsUp)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TrianglePrismFaceDir | dir | |
| Boolean | pointsUp | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### IsValid(TrianglePrismFaceDir, Vector3Int)

Declaration

```
public static bool IsValid(this TrianglePrismFaceDir dir, Vector3Int offset)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TrianglePrismFaceDir | dir | |
| Vector3Int | offset | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### OffsetDelta(TrianglePrismFaceDir)

Declaration

```
public static Vector3Int OffsetDelta(this TrianglePrismFaceDir dir)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TrianglePrismFaceDir | dir | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3Int | |

### Up(TrianglePrismFaceDir)

Declaration

```
public static Vector3 Up(this TrianglePrismFaceDir dir)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TrianglePrismFaceDir | dir | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

# Class TrianglePrismGeometryUtils

Note

This class is available only in Tessera Pro

Inheritance

Object

TrianglePrismGeometryUtils

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public static class TrianglePrismGeometryUtils
```

## Methods

### FindCell(Vector3, Vector3, Vector3, out Vector3Int)

Declaration

```
public static bool FindCell(Vector3 origin, Vector3 tileSize, Vector3 position, out Vector3Int cell)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3 | origin | |
| Vector3 | tileSize | |
| Vector3 | position | |
| Vector3Int | cell | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### FromSide(Int32)

Declaration

```
public static TrianglePrismFaceDir FromSide(int side)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Int32 | side | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| TrianglePrismFaceDir | |

### GetCellCenter(Vector3Int, Vector3, Vector3)

Declaration

```
public static Vector3 GetCellCenter(Vector3Int cell, Vector3 origin, Vector3 tileSize)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | cell | |
| Vector3 | origin | |
| Vector3 | tileSize | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

### Pack(Vector2Int, Boolean, Int32)

Declaration

```
public static Vector3Int Pack(Vector2Int tri, bool pointsUp, int y)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector2Int | tri | |
| Boolean | pointsUp | |
| Int32 | y | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3Int | |

### PointsUp(Vector3Int)

Declaration

```
public static bool PointsUp(Vector3Int cell)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | cell | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### Standardize(Vector2)

Declaration

```
public static Vector2 Standardize(Vector2 p)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector2 | p | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector2 | |

### Unpack(Vector3Int)

Declaration

```
public static (Vector2Int, bool, int) Unpack(Vector3Int cell)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3Int | cell | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| ValueTuple<Vector2Int, Boolean, Int32> | |

### Unstandardize(Vector2)

Declaration

```
public static Vector2 Unstandardize(Vector2 p)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector2 | p | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Vector2 | |

# Struct TriangleRotation

Represents rotations / reflections of a hexagon

**Note**

This class is available only in Tessera Pro

Inherited Members

ValueType.ToString()

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public struct TriangleRotation
```

## Properties

### All

Declaration

```
public static TriangleRotation[] All { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| TriangleRotation[] | |

### Identity

Declaration

```
public static TriangleRotation Identity { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| TriangleRotation | |

### IsReflection

Declaration

```
public bool IsReflection { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### ReflectX

Declaration

```
public static TriangleRotation ReflectX { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| TriangleRotation | |

### ReflectY

Declaration

```
public static TriangleRotation ReflectY { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| TriangleRotation | |

### RotateCCW

Declaration

```
public static TriangleRotation RotateCCW { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| TriangleRotation | |

### RotateCW

Declaration

```
public static TriangleRotation RotateCW { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| TriangleRotation | |

### Rotation

Declaration

```
public int Rotation { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

## Methods

### Equals(Object)

Declaration

```
public override bool Equals(object obj)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Object | obj | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

Overrides

ValueType.Equals(Object)

### GetHashCode()

Declaration

```
public override int GetHashCode()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

Overrides

ValueType.GetHashCode()

### Invert()

Declaration

```
public TriangleRotation Invert()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| TriangleRotation | |

### Rotate60(Int32)

Declaration

```
public static TriangleRotation Rotate60(int i)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Int32 | i | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| TriangleRotation | |

## Operators

### Equality(TriangleRotation, TriangleRotation)

Declaration

```
public static bool operator ==(TriangleRotation a, TriangleRotation b)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TriangleRotation | a | |
| TriangleRotation | b | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### Implicit(CellRotation to TriangleRotation)

Declaration

```
public static implicit operator TriangleRotation(CellRotation r)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| CellRotation | r | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| TriangleRotation | |

### Implicit(TriangleRotation to CellRotation)

Declaration

```
public static implicit operator CellRotation(TriangleRotation r)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TriangleRotation | r | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| CellRotation | |

### Inequality(TriangleRotation, TriangleRotation)

Declaration

```
public static bool operator !=(TriangleRotation a, TriangleRotation b)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TriangleRotation | a | |
| TriangleRotation | b | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Boolean | |

### Multiply(TriangleRotation, Int32)

Declaration

```
public static int operator *(TriangleRotation a, int side)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TriangleRotation | a | |
| Int32 | side | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Int32 | |

### Multiply(TriangleRotation, TrianglePrismFaceDir)

Declaration

```
public static TrianglePrismFaceDir operator *(TriangleRotation rotation, TrianglePrismFaceDir faceDir)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TriangleRotation | rotation | |
| TrianglePrismFaceDir | faceDir | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| TrianglePrismFaceDir | |

### Multiply(TriangleRotation, TriangleRotation)

Declaration

```
public static TriangleRotation operator *(TriangleRotation a, TriangleRotation b)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TriangleRotation | a | |
| TriangleRotation | b | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| TriangleRotation | |

# Class TRS

Rerpresents a position / rotation and scale. Much like a Transform, but without the association with a unity object.

Inheritance

Object

TRS

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public class TRS
```

## Constructors

### TRS(Matrix4x4)

Declaration

```
public TRS(Matrix4x4 m)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Matrix4x4 | m | |

### TRS(Vector3)

Declaration

```
public TRS(Vector3 position)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3 | position | |

### TRS(Vector3, Quaternion, Vector3)

Declaration

```
public TRS(Vector3 position, Quaternion rotation, Vector3 scale)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Vector3 | position | |
| Quaternion | rotation | |
| Vector3 | scale | |

## Properties

### Position

Declaration

```
public Vector3 Position { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

### Rotation

Declaration

```
public Quaternion Rotation { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Quaternion | |

### Scale

Declaration

```
public Vector3 Scale { get; }
```

Property Value

| TYPE | DESCRIPTION |
| --- | --- |
| Vector3 | |

## Methods

### Local(Transform)

Declaration

```
public static TRS Local(Transform t)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Transform | t | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| TRS | |

### ToMatrix()

Declaration

```
public Matrix4x4 ToMatrix()
```

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| Matrix4x4 | |

### World(Transform)

Declaration

```
public static TRS World(Transform t)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| Transform | t | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| TRS | |

## Operators

### Multiply(TRS, TRS)

Declaration

```
public static TRS operator *(TRS a, TRS b)
```

Parameters

| TYPE | NAME | DESCRIPTION |
| --- | --- | --- |
| TRS | a | |
| TRS | b | |

Returns

| TYPE | DESCRIPTION |
| --- | --- |
| TRS | |

# Enum VolumeType

Namespace: Tessera

Assembly: cs.temp.dll.dll

Syntax

```
public enum VolumeType
```

## Fields

| NAME | DESCRIPTION |
| --- | --- |
| MaskOut | Removes the cells inside the volume from generation |
| TilesetFilter | Restricts the set of tiles inside the volume |