Procedural Low Poly Cities - Tutorial

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Contents

1 Procedural City

To start a new *Procedural City* project go to **GameObject>Create Procedural>Procedural City**. The tool will create a new *GameObject* named *ProceduralCity Tool*. Click on the object name: a grid will be shown inside the scene and a custom editor in the inspector panel (Figure 1).

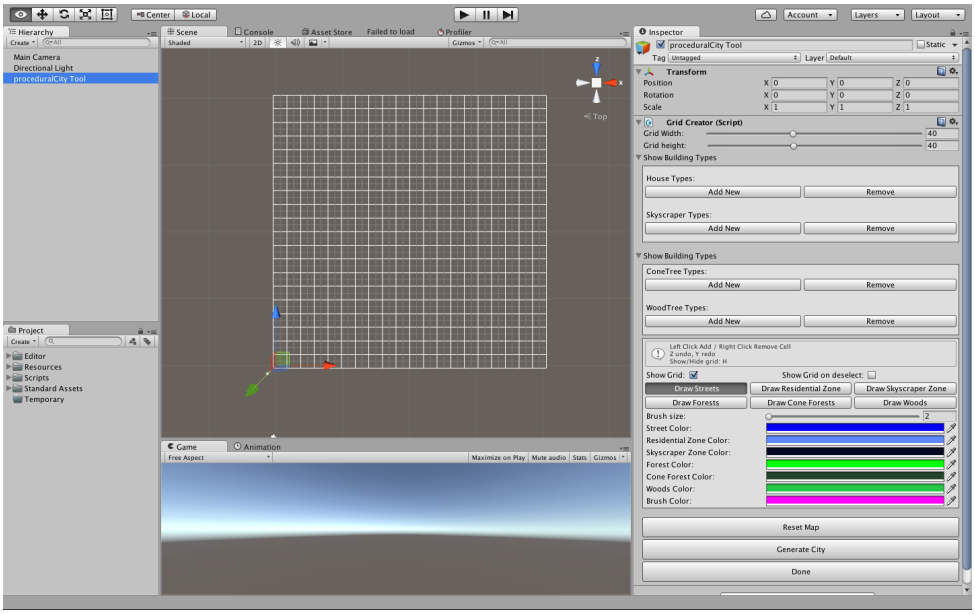


Figure 1: grid

Before starting drawing the city map, choose grid size in the editor.

1.1 Step 1: Draw Streets

To draw a street network, click on the *"Draw street"* button inside the grid editor and trace a line on the grid. This will produce a blue line in the scene and a new entry in the editor (Figure 2):

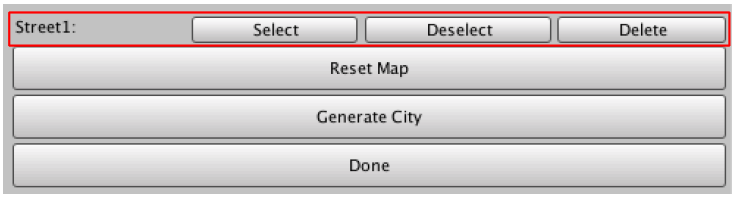


Figure 2: Street Entry

To highlight a street, click on the *"Select"* button of the entry shown in Figure 2: this will make the corresponding street turn to red. To deselect the street click *"Deselect"*. To delete a street from the grid click *"Delete"*.

1.2 Step 2: Draw Building Areas

When the city will be generated, building will be placed along the streets. To specify areas of the streets where only skyscrapers must be built, click *"Draw Skyscraper Zone"* button inside the grid editor, then choose the brush size and draw on the grid. The same process is valid for residential zones and is appliable by clicking *"Draw Residential Zone"* in the same editor. ***Notice*** that building zones drawn far from the streets will be ignored in the generation process. If no building zone is specified, both type of building will be randomly generated along the streets. An example of correct execution of this step is shown in Figure 3.

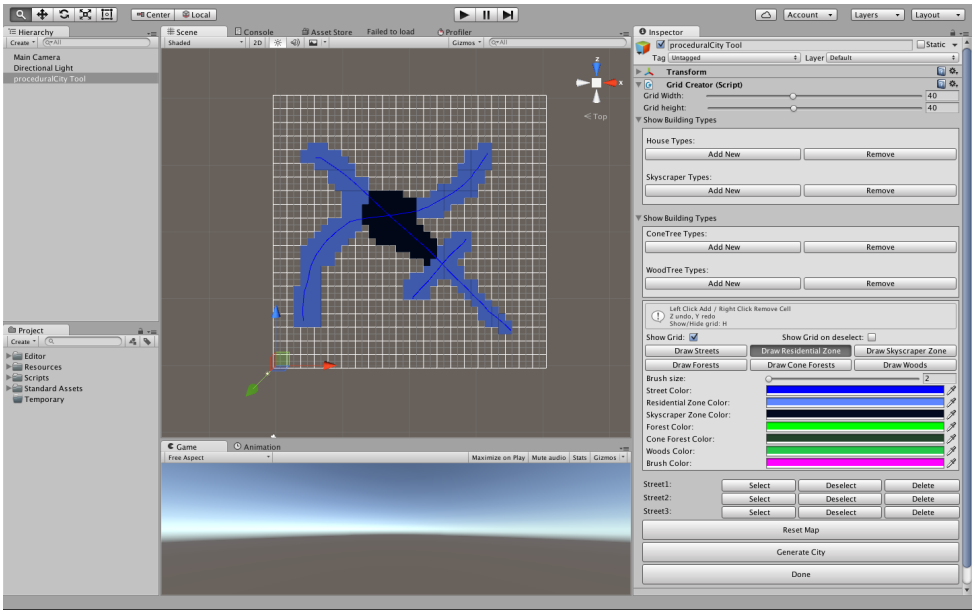


Figure 3: Example of builing zones

1.3 Step 3: Draw Forest Areas

To arrange forest areas click on the *"Draw Forests"* inside the grid editor, choose the brush size and draw on the grid. Inside a forest area, the generation process will place both conifers and large crown trees. To specify wood

areas (only large crown trees) click, instead, the *"Draw Woods"* button; for conifers areas (only conifers) click the *"Draw Cone Trees"* button. ***Notice*** that the generation process gives priority to the buildings generation so, in a position of a forest area drawn nearby the street, a tree will be placed only if there is not a building. An example of the grid state up to this step is shown in Figure 4.

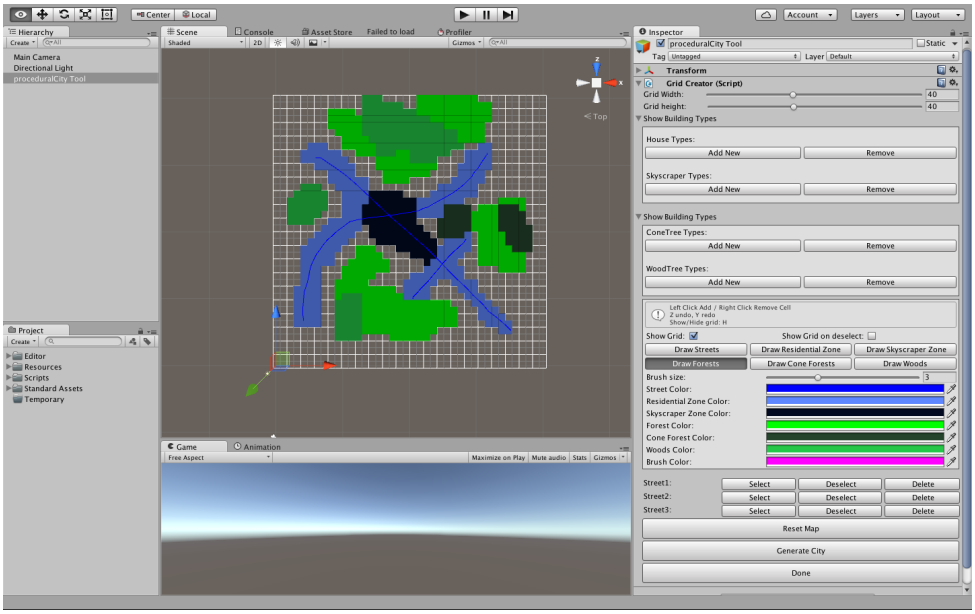


Figure 4: City map completed

1.4 Step 4: Modify drawn city map

If you're not happy with the city map drawn you can:

- delete streets as described in 1.1
- delete part of forest areas or building areas selecting the parts to delete while clicking the right button of the mouse
- delete the whole map by clicking the *"Reset Map"* button inside the grid editor

1.5 Step 5: Add building and tree types

Before generating the city model, choose types of buildings and trees by using the section of the editor shown in Figure 5.

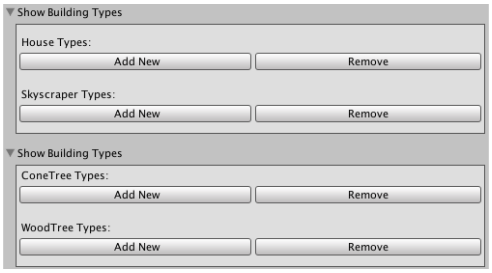


Figure 5: Editor for the selection of building and tree types

Each list must have at least one type. A type can be a personal prefab (added by dragging it into the provided space) or an element procedurally generated by the tool. Each entry left blank will cause the procedural generation of an element.

1.6 Step 6: Generate City

To generate the city model, click on the *"Generate City"* button inside the grid editor. This operation creates a new *Terrain* object which contains all the elements of the city. The 3D model is shown with a top-down view inside the scene (Figure 6).

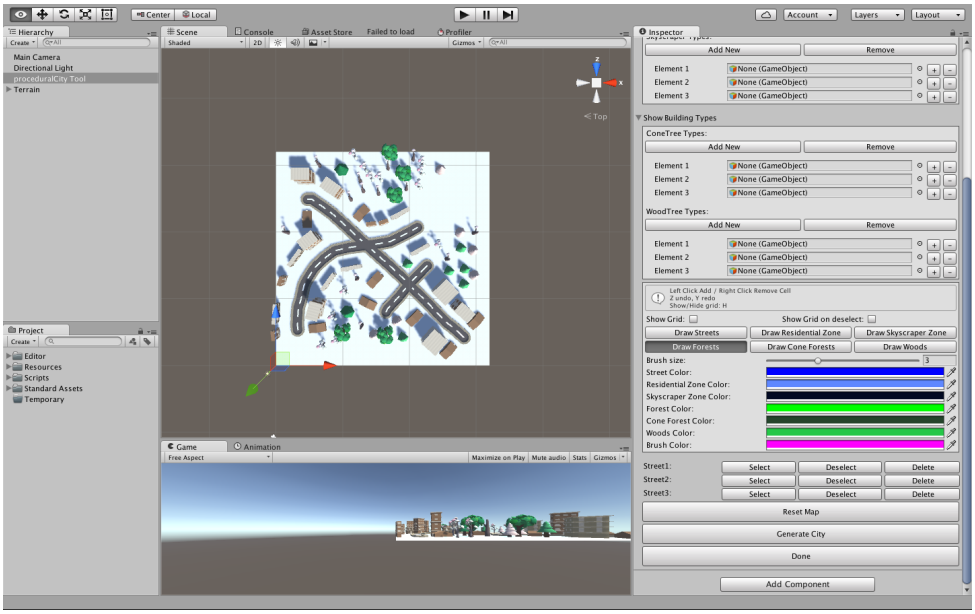


Figure 6: Procedurally generated 3D city

1.7 Step 7: Modify generated city

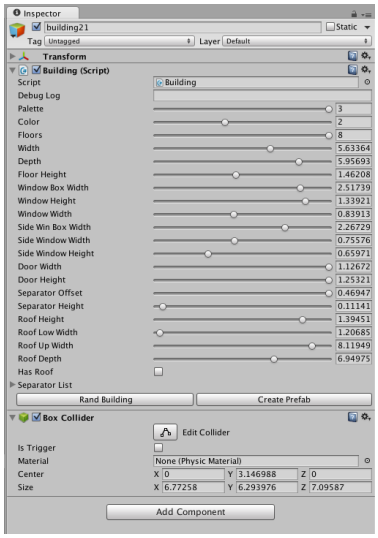
Buildings and trees can be moved, deleted and modified. To execute anyone of these operations, click on the object inside the scene and then make sure the selection is correct.
To ***delete*** an object, simply select it and press the *Canc* key on your keyboard.
To ***move*** and object, select it and use Unity moving tool to drag it anywhere in the map.
To ***modify a building***, select the building: the inspector will show a different editor. Click on the *"Random Building"* to change the building appearence. If the building is still not satisfying, modify features value of the building one by one or generate a new *"Random Building"*. If you want to change an individual floor, select it, modify its features value and check the *"Floor changed"* box.
To ***modify a tree***, select the tree: the inspector will show a different editor. Click on the *"Random Tree"* to change completely the tree appearence or on *"Random Seed"* to obtain a similar tree. If the tree is still not satisfying, modify features value of the tree one by one or generate a new *"Random Building"* or *"Random Seed"*. ***Notice*** that if a tree is almost satisfying and you want to remember it while trying to obtain a better result (by clicking only on *"Random Seed"*), simply remember its seed: retyping the seed in the appropriate space will produce the old tree.

1.8 Step 8: Save city model

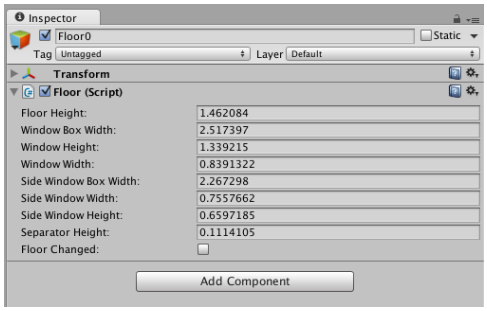
In order to use the city model in your project, you have to delete all the editable object. This operation is accomplished by clicking the *"Done"* button. The city model will be saved in the *Temporary* folder, ready for use. ***Notice*** that deleting all the editable object means the city will not be modifiable anymore, so make sure to be happy with the result.

2 Procedural Building

To create a new building (which can also be placed inside a city model) go to **GameObject>Create Procedural>Procedural Building**. The tool will create a new *Building* object in the scene. Click on the object: the inspector will show a custom editor. To modify the building use the process described in 1.7 (building and floor editor are shown in Figure 7). To save a building as a prefab in order to use it in future projects, click on the *"Create Prefab"* button: a prefab will be created in the *Temporary* folder.



(a) Building Editor



(b) Floor Editor

Figure 7

3 Procedural Tree

To create a new tree (which can also be placed inside a city model) go to **GameObject>Create Procedural>Procedural Tree**. The tool will create a new *ProcTree* object in the scene. Click on the object: the inspector will show a custom editor. To modify the tree use the process described in 1.7. To save a tree as a prefab in order to use it in future projects, click on the *"Create Prefab"* button: a prefab will be created in the *Temporary* folder.

Now you're ready to use the Procedural Low Poly Cities tool. Have fun!