Modular Meshes – Unity Project

(Labture 1, Labture 2 start)

Shape Grammars (Labture 1)

1. Open the *GrammarsDemo* scene, and enter playmode. Note that a few structures are built. You can press Space to randomly generate new variants of the structures again.
2. Open the *Stack* script (in the *ExampleGrammars* folder). (Un)comment the different lines of code here, and observe the effects (after saving the script and entering playmode again). Can you explain what you see?
3. What kinds of shapes can you create by making small changes in the *Stack* script? Can you create the shapes shown on the next page?
4. Enter playmode, and look at the Facade object. Select the bottom wall in the hierarchy. Can you place a door here? (Still in play mode! Hint: use the Generate button in the inspector.) The placement of the door is random. How could you improve the customization workflow here?
5. The Facade game object has a *Facade Parameters* component. Try adding different wall patterns, and see the result by pressing the Generate button. How do all the child game objects get a reference to this Facade parameters component? (Look at the scripts)
6. Open the *RandomGenerator* script, and change it to use a seeded pseudo-random generator (see the lecture slides). If successful, the same shapes should be generated every time you press space, unless you change the seed value in the inspector. (Note: this doesn't work yet with the Generate button in the inspector!)
7. *(Styles:)* Can you make two different building prefabs, where one has wooden walls and a red roof, and the other stone walls and a green roof?

Next step:

1. Extend one of the given shape grammars (Facade or SimpleBuilding), for instance:
    a. Can you ensure that doors are only generated on the ground floor?
    b. Can you use a fancier style or larger height for the top floor?
2. Create your own shape grammar, for instance to create buildings or city maps. *Tip:* start simple, and expand! Use pen and paper to figure out the math (e.g. position offsets)

Marching Squares (Labture 2 start)

1. Open the *MarchingSquares* scene, and enter playmode. A place is filled with prefabs, representing a 0/1 grid (for clarity, some trees are placed at the zero values, as debug information). If you press G and then space, a new grid structure is shown.
2. Open the *ValueGrid* script and look at the *InitializeGrid* method. What kind of interesting shapes can you generate here? Can you generate e.g. a set of horizontal & vertical roads?
3. Go to the *MarchingSquares* component in the inspector. You can drag in different prefabs in here, following the formula for the number of corners (see the tool tip). For instance, use the

roof, roofCorner, roofCornerInner object, etc. Can you create shapes like shown below? *Hint:* you need to change the rotation values as well when using different prefabs.

Next step:

3. Find interesting applications of the marching squares tool. How can you use it in your city? How can you initialize it?

Example shapes (the last shape is related to marching squares):