Butterfly Wing – Custom Object

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Object Description:

This object models a butterfly wing. This object makes up one half of a butterfly.

This model is stored in "MushroomForest/OBJ/rightButterfly.obg" The right side is a similar model, with the X element of each vertex negative, and the faces reordered to preserve counterclockwise parsing.

This custom object was created by hand calculating the vertex positions, then entering these values into an OBJ file.
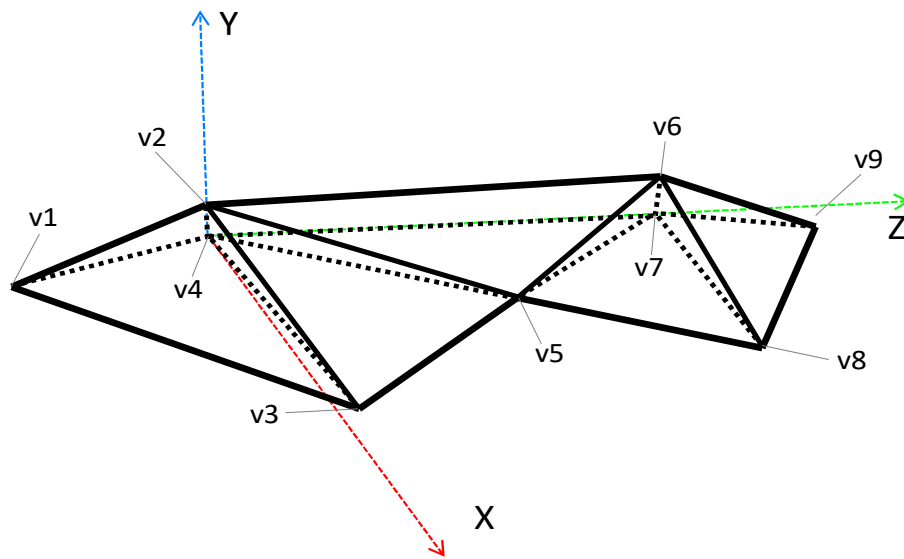

Figure 1 - Vertex Diagram of right wing

Vertex Number	X	Y	Z
v1	0.300	0.050	−0.150
v2	0.000	0.100	0.000
v3	0.600	0.050	0.450
v4	0.000	0.00	0.00
v5	0.300	0.050	0.633
v6	0.000	0.100	0.750
v7	0.000	0.000	0.750
v8	0.450	0.050	0.900
v9	0.150	0.000	1.000

| Face Number	Vertexes			
f1	3,	1,	2	
f2	1,	4,	2	
f3	5,	3,	2	
f4	4,	7,	6,	2
f5	6,	5,	2	
f6	1,	3,	4	
f7	3,	5,	4	
f8	8,	5,	6	
f9	9,	8,	6	
f10	7,	9,	6	
f11	8,	9,	7	
f12	5,	8,	7	
f13	4,	5,	7	

Animation Description:

The butterfly is made from the rightButterfly model and the leftButterfly model. Having separate models for each wing allows each wing to have separate rotations, allowing for the animation

The animation consists the butterfly flapping its wings while it rotates around a point. The wings will rotate in the Y axis. And the butterfly as a whole will rotate around a fixed point. The wings therefore need to rotate relative to the whole butterfly.
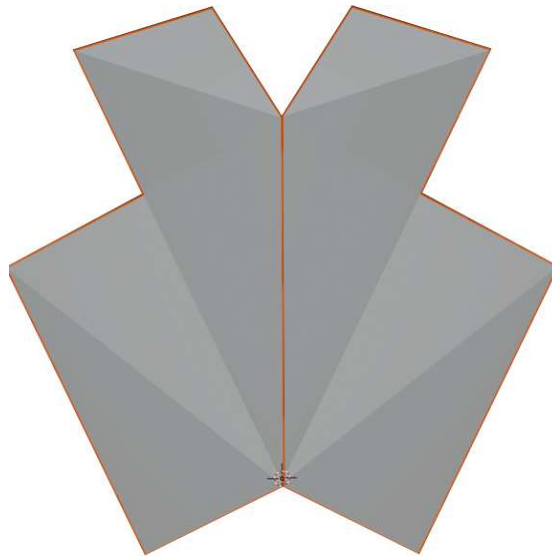
Figure 2 - Top down view of the butterfly

Below is an image of the butterfly in the animation. No lighting is applied to the model to make it look completely white and ethereal.
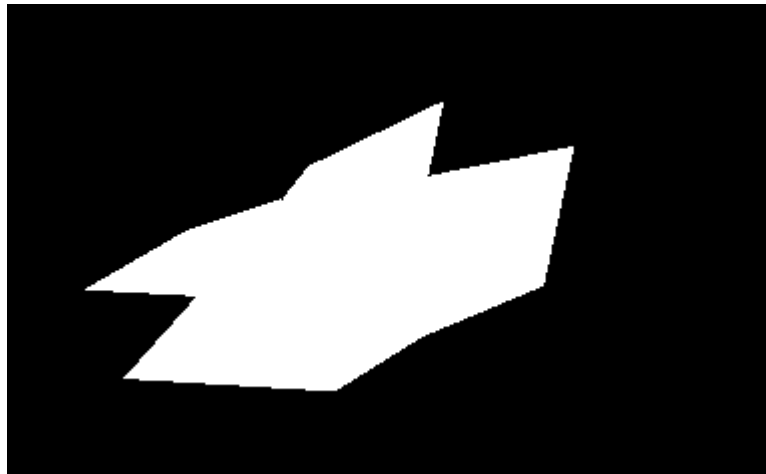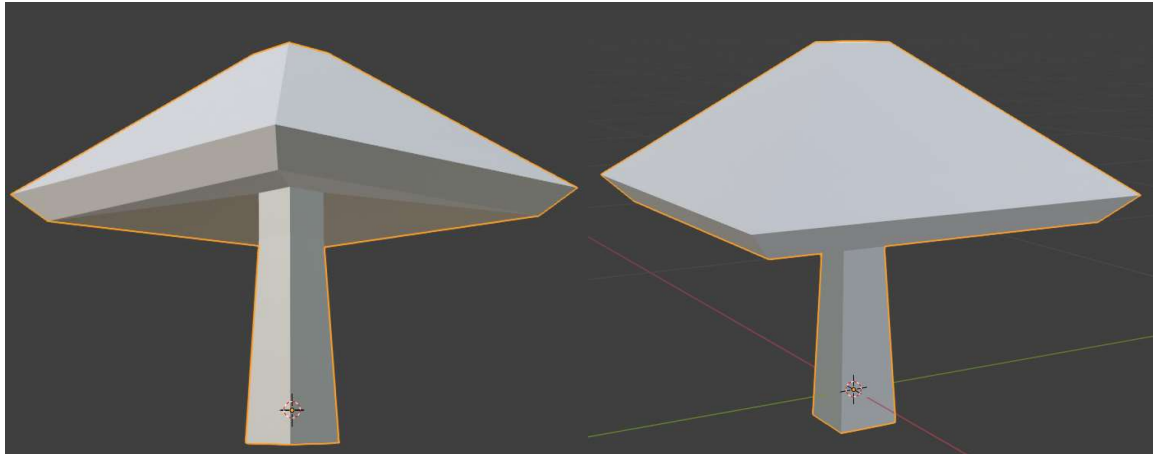

Figure 3 - Screenshot of butterfly

Mushroom Objects

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Object Description:

The mushroom object is too complex to calculate the vertices by hand, so I created this model in a 3D modelling program – Blender.

This model was created by first creating a square based, low poly version seen below.

Figure 4 - initial mushroom model

Then a subdivision modifier was applied to generate 3 versions of the model. A low, medium and high polycount version. Lower quality models can be used for small mushrooms in the animation, and in scenes where there are many mushrooms. Larger models can be used for the few larger mushrooms in the animation.

Below are the 3 models, high, medium and low.

The low poly count model has 323 faces. It will be used for the small mushrooms in the animation, when over a certain amount (100) of medium poly versions are drawn. This is to prevent the scene from becoming too slow

The medium poly count model has 1300 faces. And will be used for the large static mushrooms in the scene, as well as for the smaller mushrooms when there are only a small number that are drawn.

The High poly count model has 5000 faces, this is very high so only one of these is drawn in the scene as the largest of the static mushrooms.

Animation Description

The small mushrooms will perform a scaling animation. They will shrink and grow from their base size to a scale of 0. The function that controls this uses a sine wave to scale, so they scale in and out smoothly. Lastly a phase offset is added to this sine function to offset the animation phase based on the mushrooms position. This allows for a traveling wave effect over the entire mushroom field that can be seen below.
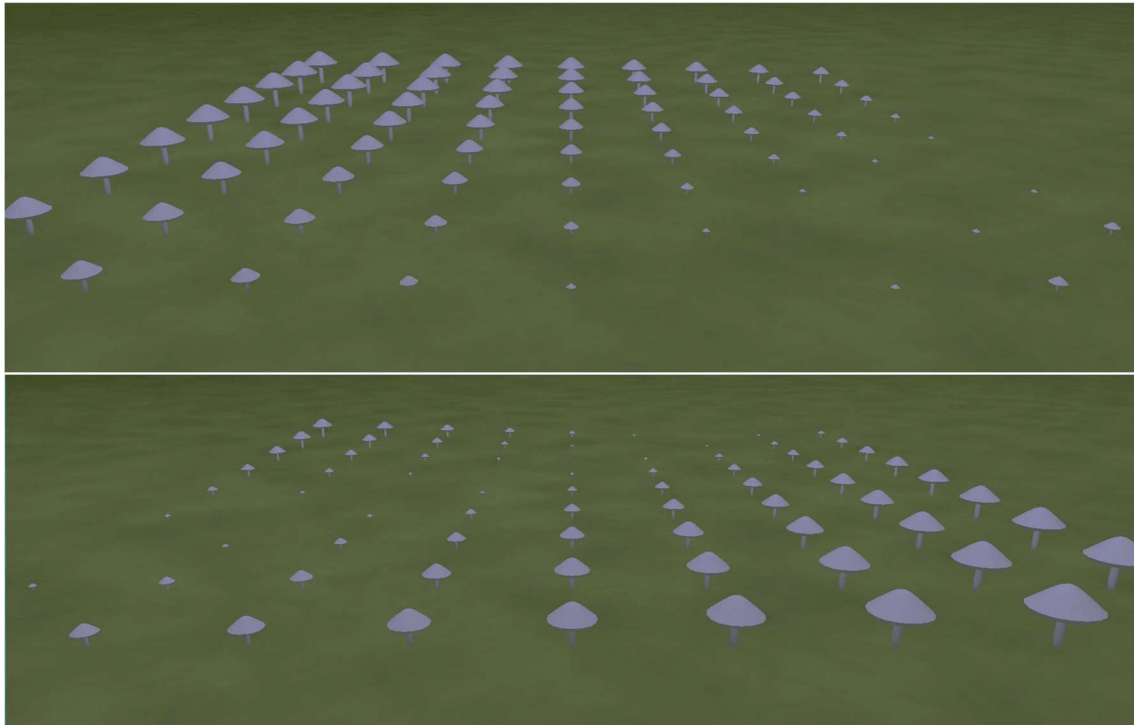

Figure 5 - screenshots from the animation showing the size of the mushroom depends on its position

The user can interact with the scene by increasing or decreasing the number of mushrooms using the + and – keys. This will decrease or increase the size of the mushroom field.
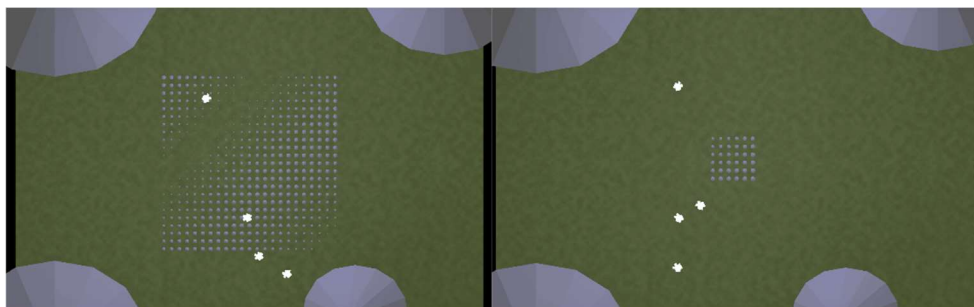
Figure 6 – Screenshot showing two sizes of mushroom field

Larger mushrooms will also be in the scene around the outside. These are static and do not move but help to make set the scene of the animation.
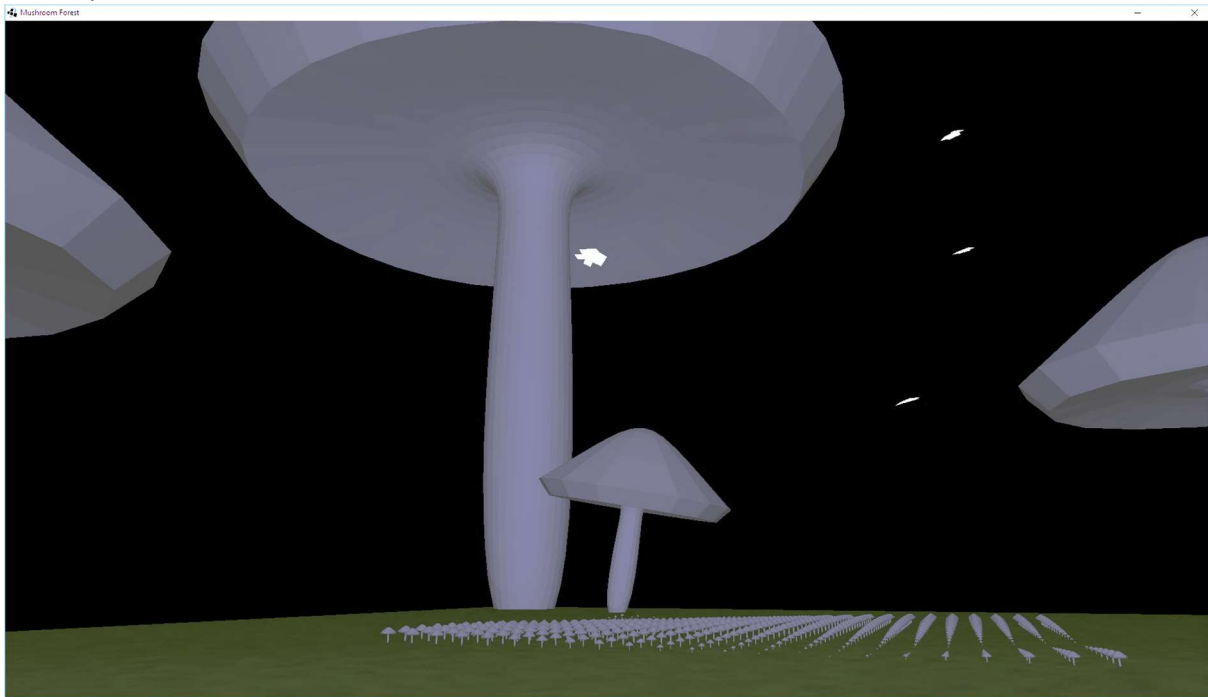
Figure 7 - Wide screenshot showing larger mushrooms in the scene