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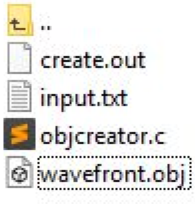
Project 5

Wavefront .obj file creator

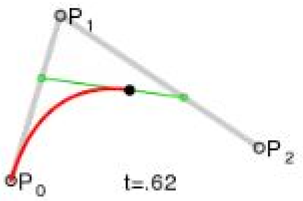
Input: Bezier control points | Output: wavefront obj file | Algorithm: Quadratic Bezier Curve + Write to file.

For this project, I wanted to move what we learned in the class outside of the opengl window into a format and place that will utilize geometric modelling. I have written a program that will read in control points from a file and will create a smooth 3D model of them. You can see below the directory is simply the code/executable, the input file, and the output file.

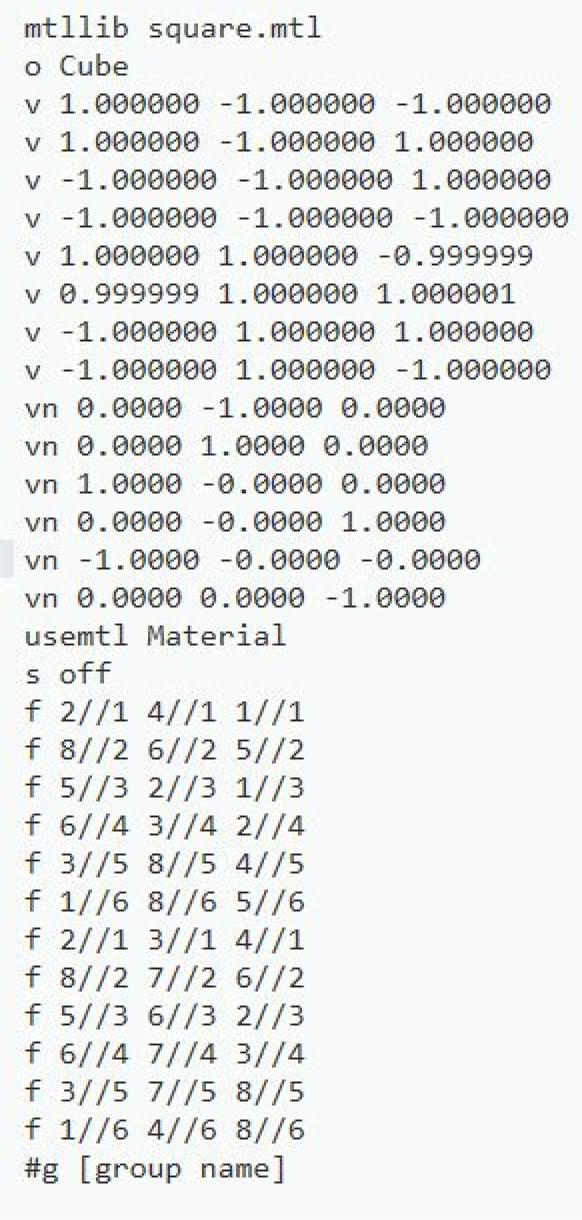


```
..
create.out
input.txt
objcreator.c
wavefront.obj
```

The input in my project handles 3 control points in order to make a quadratic Bezier curve. Using a simple Bezier algorithm from "https://stackoverflow.com/questions/785097/how-do-i-implement-a-bézier-curve-in-c/11435243#11435243," I was able to generate the curve out of the control points following the image below.

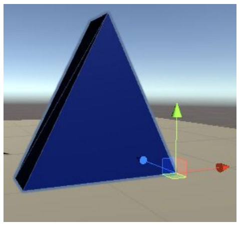


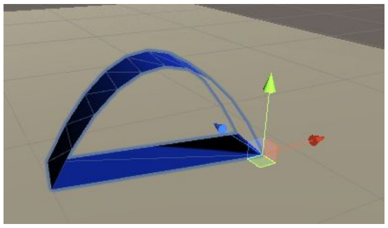
All I need to make the wavefront file is the black dot in the picture above. An example format of an obj file can be seen here:

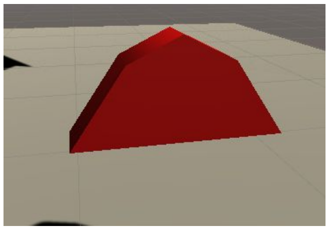


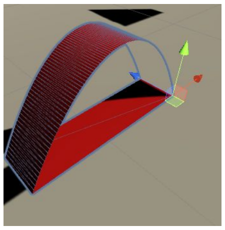
```
mtllib square.mtl
o Cube
v 1.000000 -1.000000 -1.000000
v 1.000000 -1.000000 1.000000
v -1.000000 -1.000000 1.000000
v -1.000000 -1.000000 -1.000000
v 1.000000 1.000000 -0.999999
v 0.999999 1.000000 1.000001
v -1.000000 1.000000 1.000000
v -1.000000 1.000000 -1.000000
vn 0.0000 -1.0000 0.0000
vn 0.0000 1.0000 0.0000
vn 1.0000 -0.0000 0.0000
vn 0.0000 -0.0000 1.0000
vn -1.0000 -0.0000 -0.0000
vn 0.0000 0.0000 -1.0000
usemtl Material
s off
f 2//1 4//1 1//1
f 8//2 6//2 5//2
f 5//3 2//3 1//3
f 6//4 3//4 2//4
f 3//5 8//5 4//5
f 1//6 8//6 5//6
f 2//1 3//1 4//1
f 8//2 7//2 6//2
f 5//3 6//3 2//3
f 6//4 7//4 3//4
f 3//5 7//5 8//5
f 1//6 4//6 8//6
#g [group name]
```

The obj file takes lines of v (vertexes)~~, vn (vertex normals),~~ and f (faces). I would write to a .txt file the x,y coordinates twice with the second write with a z value of +1 and also the vertices that make up a face. Then rename the file to be an obj. You can see now the iterations of the Bezier control points below getting finer and finer.









You may have noticed in the picture that the models are imported in Unity. There we can see the wavefront obj file working as well as treat it as any other gameobject. You can apply scripts to move them, rigid bodies and colliders to see them interact with the environment.