Assignment 3

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1 Introduction

In this assignment we were expected to first, turn a webgl code to webgl2 in part one and then change the square shape that was given to us to triangle with different colors for each vertex and then add some functions to it, second, we were asked to add some functions with buttons to the object that we had already created on the previous assignment.

2 Experiment

2.1 Part 1

In the part 1 of the assignment, we were asked to turn the webgl code to webgl2, to do that i used webgl2 fundamentals' [2] website to achieve what was wanted, then we were asked to change the shape to triangle with random colors for each vertex of it. For the functions, we were asked to make a random color function and to achieve that, i added a uniform to fragment shader that was feeded by random number and in the shader i used sin, cos, frac and random numbers to make it more random. To change the direction, i added and if statement to the app file that changed the theta to positive or negative depending on the input. For speed i added delay to the render function that changed the delay depending on the input again.

2.2 Part 2

In the assignment's part 2, we were asked to make 3 different functions for the user. Firstly, for the object to fit into the canvas i have made it smaller than before by half for spiral movement.

For the first function of the second part, which is spin, i have basically used the previous function i did, just changed the way to get input by clicking the

button instead of keypress and added input type number to change the speed of it.

For the second function, scaling to get a heart-beat shape, i have added a scale matrix to the vertex shader and added a boolean to use for the render function of app that started to feed the vertex shader's scale matrix by values to scale the object.

For the third function, spiral movement for the object, i have added a loop to calculate the x and y coordinates for first half of loop and to get the object to origin, i sent those x, y values to an array and added the same x values with negated y values to the array which ended up giving me the full spiral coordinates. To get the spirals speed and direction, again i took the value from input type from html file and depending on the direction of it, i sent the coordinates from array to shader for the translation matrix that i added to vertex shader. If the speed is negative, it starts to traverse the array backwards and if its positive then forwards. To change the speed, i took the input value and used it to traverse the array depending on the value it had. For example, with value 1 it traverses the array by 2 values x and y, for value 2 it traverses array by 4 for x and y values.

Since i did not have any classes i cannot fill the classes table.

Table 1: Methods

Method Name	Input(s)	Output(s)	Info
render2	No input	-	Sends data to shaders.
buttonActions	id	-	It changes boolean values for render.
circleBuff	buf, circ, $\text{circle}_{c}olor$	-	It buffers data for circles.
squareBuff	buf, sqr, $\text{square}_{c}olor$	-	It buffers data for squares.
circleDraw	buf, circ, $\text{vertex}_{l}ocation, color_{l}ocation$	-	It draws the given circles.
squareDraw	buf, sqr, $\text{vertex}_{l}ocation, color_{l}ocation$	-	It draws the given squares.

3 Conclusion

I have learned how to rotate, scale and transform the objects in webgl2. After the previous assignment this felt similar with more functions to deal with. Spiral animation was difficult for me, but it ended up working okay. Similar codes can be found in our book at [1].

References

[1] Edward Angel and Dave Shreiner. Interactive computer graphics. https://www.interactivecomputergraphics.com/, 2020. Accessed: 16-11-2020.

[2] webgl2. Webgl2 fundamentals. https://webgl2fundamentals.org/, 2020. Accessed: 16-11-2020.