CS 551 Write-Up Assignment#1

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1. A discussion of the difficulties that you have encountered in this assignment.

This is my first time working with OpenGL, so I have met a lot of difficulties in this assignment. From getting the general idea of the assignment to implementing the algorithm, and to compiling the program in a specific machine, I have put so much effort into it. Thanks for Prof. Eugene Zhang giving me extra time for the assignment, and thanks for the TA Mr. Rajski giving me so much help.

The first difficulty I have me is to get the general idea of the assignment. To be honest, I have no experience in working with OpenGL before, and have had no understanding of it. The first assignment asks us to implement some functions that achieve the operation that OpenGL functions do. This is a big challenge for me. I don't even know how these functions work. After searching for those functions online, I found that I almost found nothing useful for the assignment. Most of the resources are talking about how to use those "gl" functions, but not how to implement them. The way to use them is already shown in the following code of the assignment. So I have to create them from nothing by myself. Fortunately, after talking about I ideas with TA, I finally get the way to implement them. After that, the left coding part became pretty easy, and I was able to finish it in not much long time.

The second difficulty is to determine the color of each pixel. If the triangle has only one color, the job is pretty easy, but if the three vertexes of the triangle all have different colors, the colors of the pixels in the triangle become kind of complicated. At the beginning, I really didn't get the idea how to deal with it. After talking with the classmates and the friendly TA, I finally came up with the idea that can solve the problem and be able to implement it in my code. However, The color is still different from it should be, and then I found out that it is my algorithm's problem. I tried to fix the algorithms and it finally worked. Due to the time issue, I haven't got a chance to fix the bright line in the middle, although there is a rough solution in my head.

The third difficulty I have met is to compile the program on a specific machine. Some headfiles in the code provided by professor only works under Windows system. However, unfortunately, I only have mac to work with. I tried several ways to let the code work on mac but it turns out failed. Then, my second solution is to use the Windows machines in Kelley library. However, there is also an error keep showing up and telling me that the headfile “glut.h” is missing. I searched online, and tried to solve this problem by manually installing it, but I failed. The computer asked about an administrator account to do those operations. Finally I used the computer in Graphic Lab, and it completely solve the problem.

I didn’t count the exactly time of how long I spent on these problems, but they are huge problems for me, and what I can tell is that all of them take me days to get the solution.

2. A discussion of possible enhancement of your program.

There do exist some things that can be improved in order to speed up the program. The biggest thing is the algorithm plots the triangle. The way I use is to narrow down the range of the pixels into a small square that determined by the maximum and minimum of three vertexes’ coordinates (x and y), then use the barycentric coordinates to exam every pixel in the ranged square and tell whether it is in the triangle or not. The algorithm I use prevent the thing that exam every pixel in the frame buffer and kind of speed up the performance. However, it is not the best solution to draw the triangle. It also has the chance to waste time on testing almost every pixel of the square that is not in the triangle. By implement a better algorithm can surely speed up the performance.

The second thing that can be improved is that my program doesn’t cover many situations. It can only draw triangles, and it also can only draw one triangle at a time. I want to implement a program that will treat the first three points as the vertexes of the first triangle, and if there exists another three points, it will plot the second triangle. Also, if the number of the rest points is not enough to be treat as a triangle, the program will ignore them. However, I didn’t cover this part in my code. I only let the program deal with only three points. This is not hard for me to implement, but due to the time issue, I had to give it up. There is another thing that I just mentioned above: my program can only handle the triangle. I looked up the function “glBegin”, it has many kinds of flags, which means it can handle many kinds of situations. Only for the triangle part, the function provides several ways to plot it. However my program can only draw one simple triangle at a time. This is the part that I think my program can also get better in.

The third thing is the main algorithm part. There exists some bright lines in the middle of two triangles and they shouldn’t be there. I really under stand what’s going on there and I think I know how to solve it, however due to the time issue, I cannot finish that part.

Summary

I'd like to right a short summary for this assignment. This is the first time I work with OpenGL and graphic things. I have met a lot of problems, but my biggest problem is the time. Thanks for professor giving me two extra days to finish the assignment, but I am really sorry that I cannot finish it completely in the end. I will do a more strict time management next time and try to do better in the assignment.