**Programming Project Report**

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**Problem Statement:**

The goal of this programming assignment is to develop a graphics program that displays images of fireworks after they have exploded. The inputs of the program are to change the display angle in the x and y directions by 5degrees. There was no error handling required for code.

**Design:**

* Describe the design decisions you made.
* What data structures did you use?
* What algorithms did you use?
* What were pros/cons of choices above?
* This section should be 1-2 paragraphs long.

The design was based off provided code. It would contain a init function which clears the colors and defines the orthographic projections. Then a draw function would use OpenGl to draw the explosion. Finally the Display function will call the draw function to display the explosion to the screen. In the main function it sets up the Gl window and define callbacks for displays.

**Implementation:**

To implement this first the init() and main() functions were created. The main function contains the parameters to set up the window and display the controls menu. Next the drawExplosion() function was created. This took in xyz, color, and size parameters. Then it uses glColor3f to set the current drawing color to specific rgb values. A for loop iterates over angles from 0 – 360 with step size of 15 degrees. Then a variable called random Factor generates a number between 0.8 and 1.2 to add variety to the line lengths. Next a variable called lineLength calculates the final length of the line based off the size. Then a variable called angle gets a random number between 0-359. This is then used to convert angle and length to Cartesian coordinates using cos(angle) and sin(angle) which are then stored in y2 and x2 respectively. Lastly glBegin(GL\_LINES) specifies the beginning of a sequence of lines. Then glVertex2f defines the specified cordanates.

**Testing:**

The testing of this program was quite simple. Compile and see if the fireworks were rendered in 3d. Then test the rotation mechanics. Everything worked as expected.

**Conclusions:**

The project was a overall success as the Fireworks were properly rendered on the screen in a 3d plane. If I were to continue this project I would make it so it does not regenerate the image every time you rotate the image. This project took about 3 hours to complete and 30 minutes for this Report.