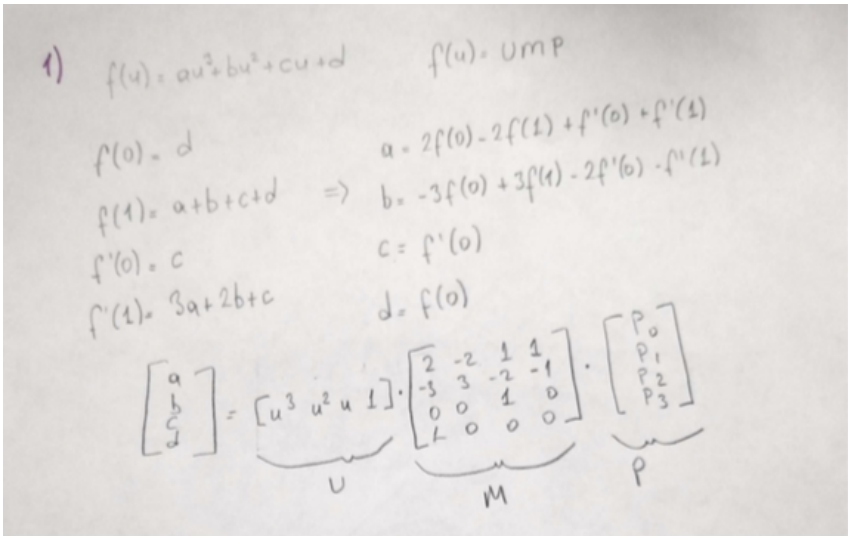
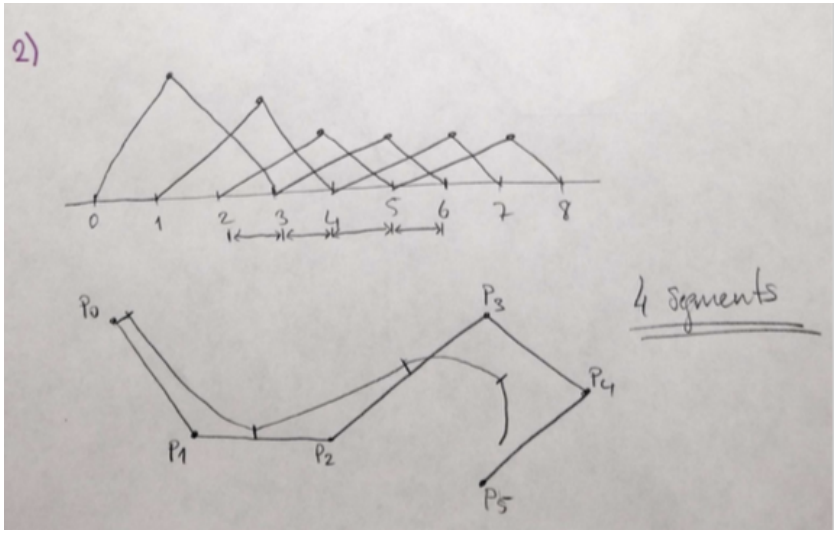
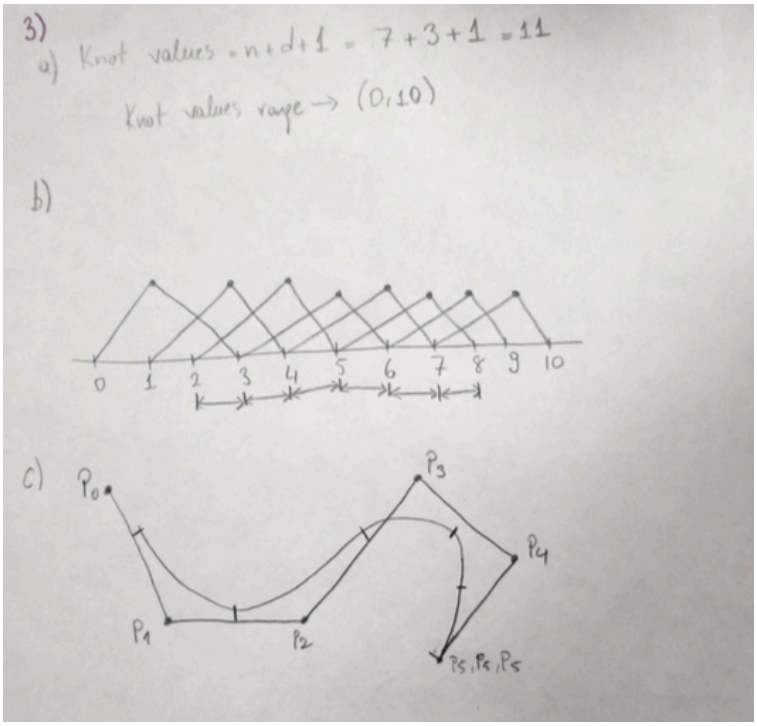
CS 460
HW-5
Selin DINC

Theory







Programming Part

Problem Statement

- **Part 1:** Creating a surface with using Bezier patch. This patch contains 16 control points that user can move to change the shape of the surface by using keyboard. Any of the 16 control points are moveable (extra credit).

- **Part 2:** Lightening the surface by using OpenGL lighting functions. User can select the flat or smooth surface lightening and also can modify the surface at the same time.

- **Part 3:** Changing the illumination effects such as diffuse reflection, specular reflection and shining by selecting the menu and using the keyboard.

Algorithm Design

Bezier Surface

Creates 16 control points. Calculates the Bezier curve for each row. Uses each point that calculated as a control point to control another Bezier curve. Runs Bezier curve for each point to calculate. Renders the triangles from that points.

Changing the Control Points

Surface has 16 control points. Each of them has a place at the Menu. By clicking of them and using the up-down-left-right-w-s keys. Any of the 16 control points van be changes from the menu.

Lighting (display)

Initializes the openGL light functions with the given diffuse, ambient and shininess values. Sets the material color to green with white specular.

Triangle

Creates a triangle struct. Makes and draws triangles. Calculates normals for vertices by finding the average of every other triangle normal that uses that vertex.

Changing The Camera View

By using the i,j,k,l keys user can change the camera views.

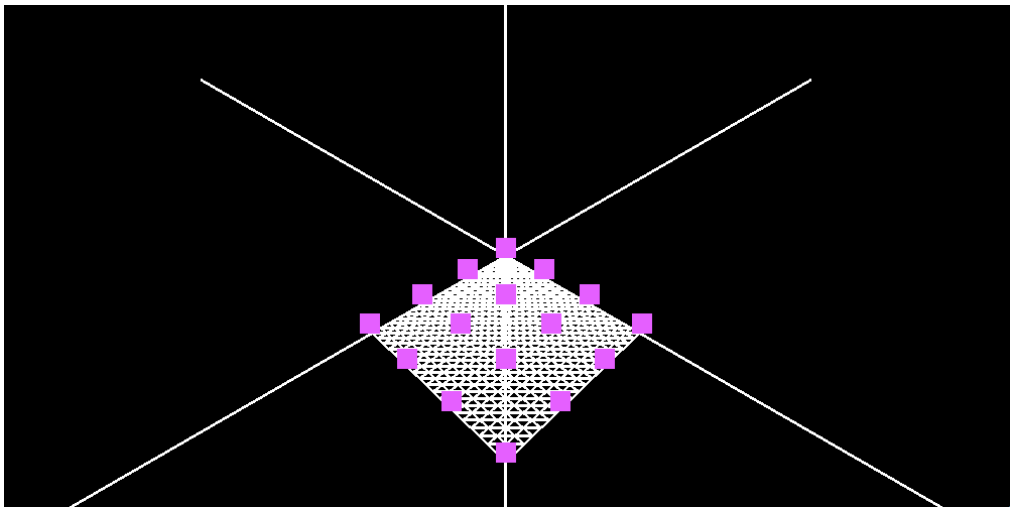


Figure 1: Bezier Surface

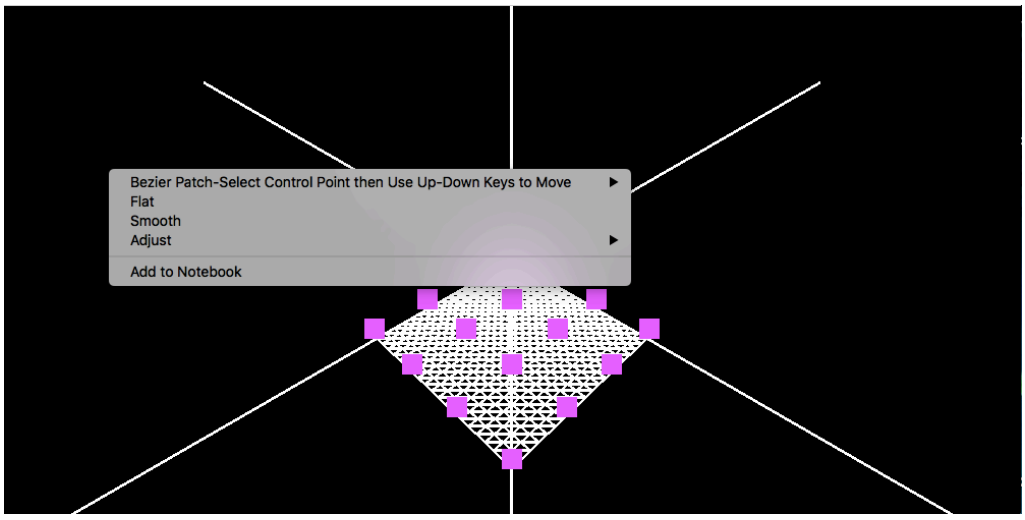


Figure 2: Menu

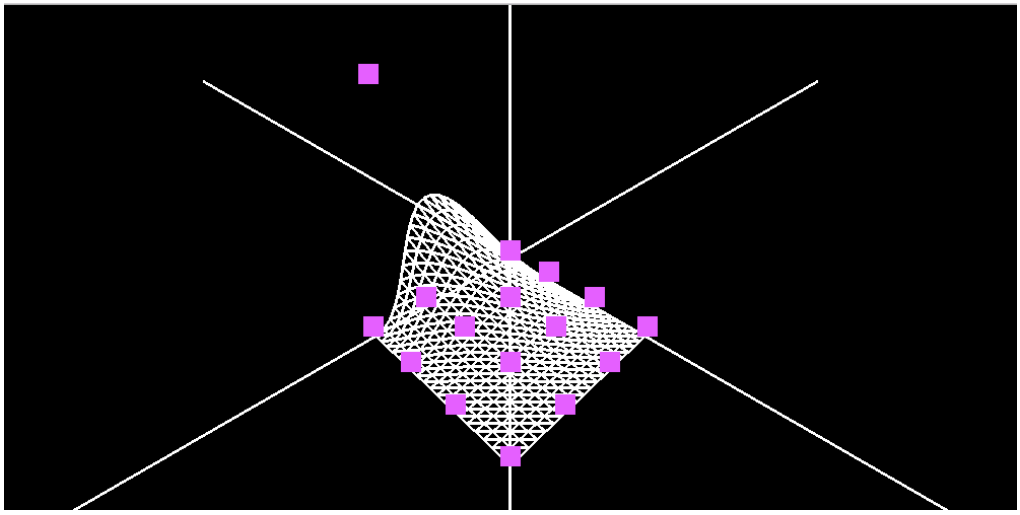


Figure 3: Moving Control Points

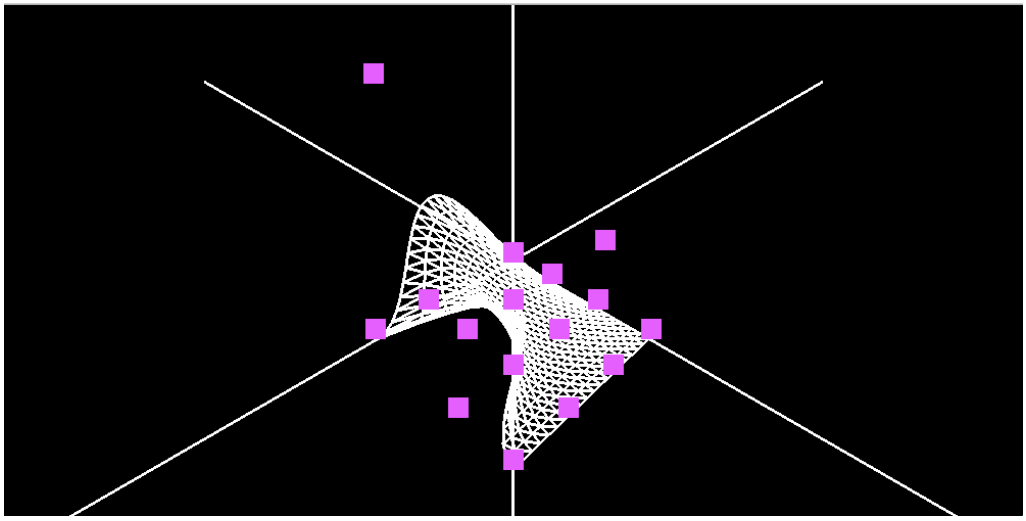


Figure 4: Moving Control Points

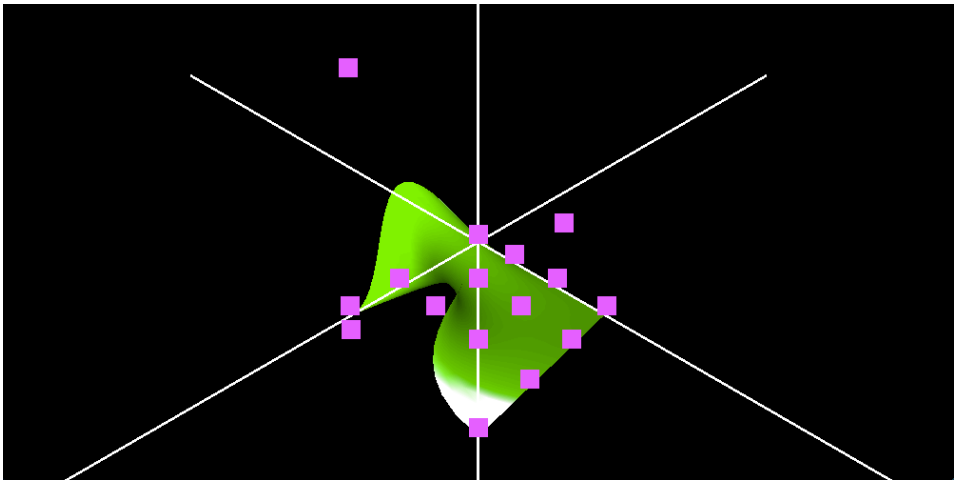


Figure 5: Flat

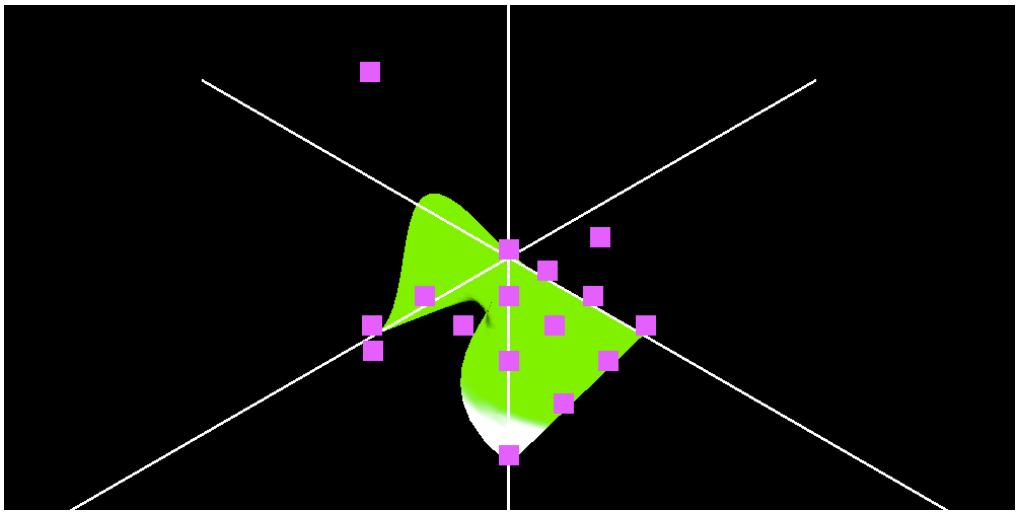


Figure 6: Increasing Diffuse

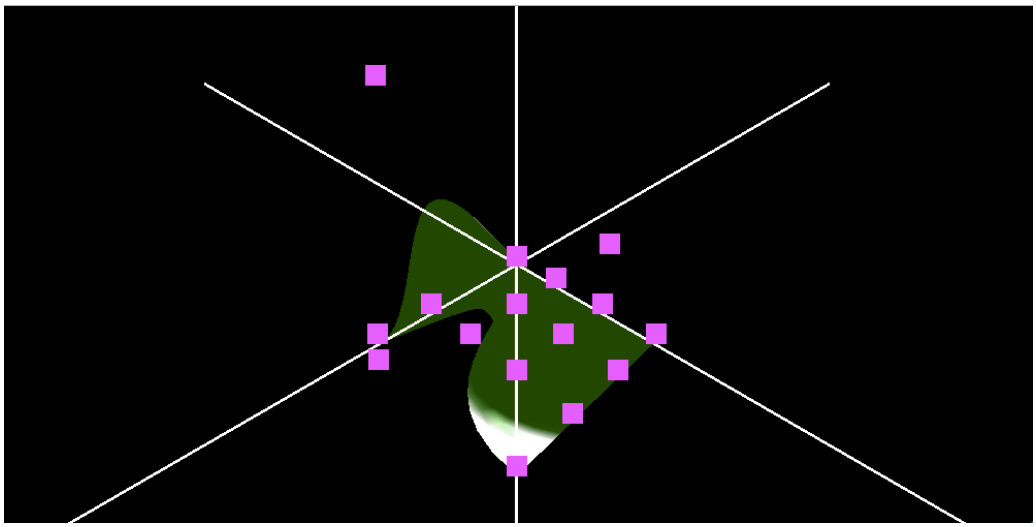


Figure 7: Decreasing Diffuse

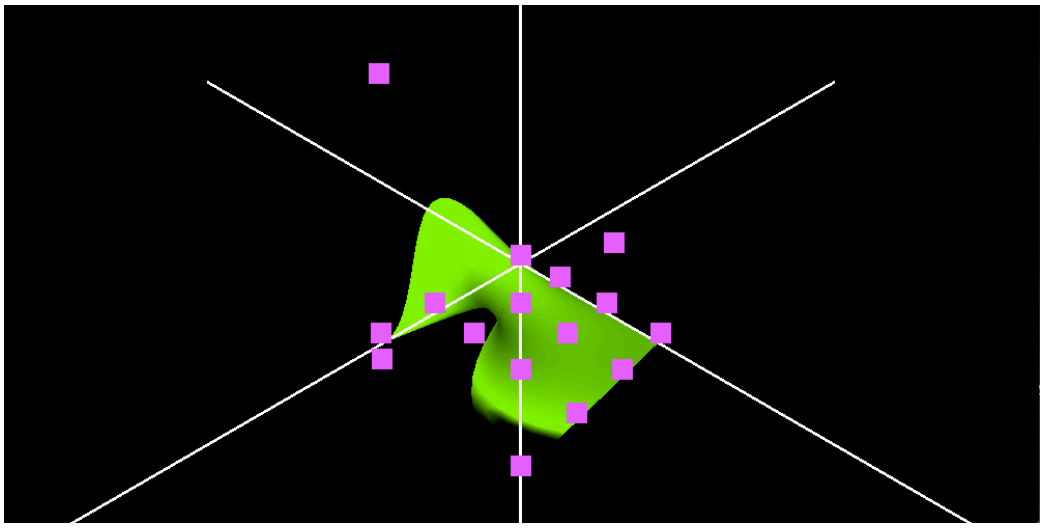


Figure 8: Increasing Specular

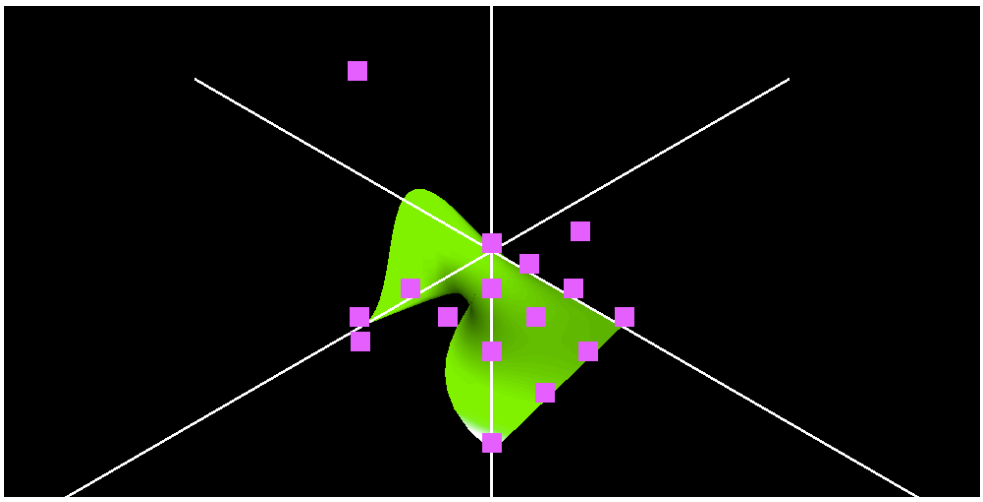


Figure 9: Increasing Specular

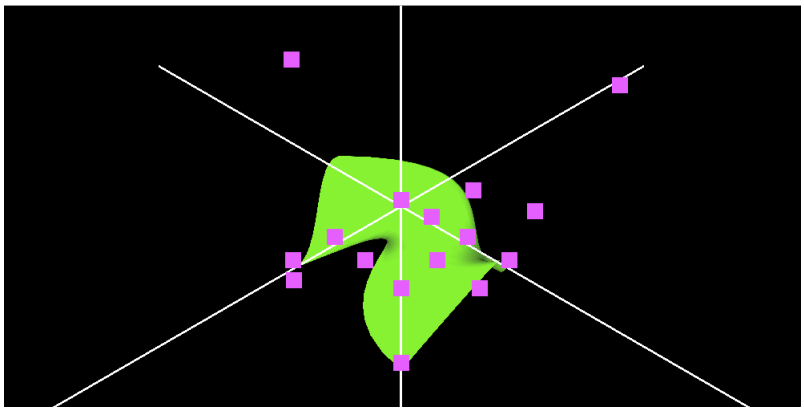


Figure 9: Decreasing Shine

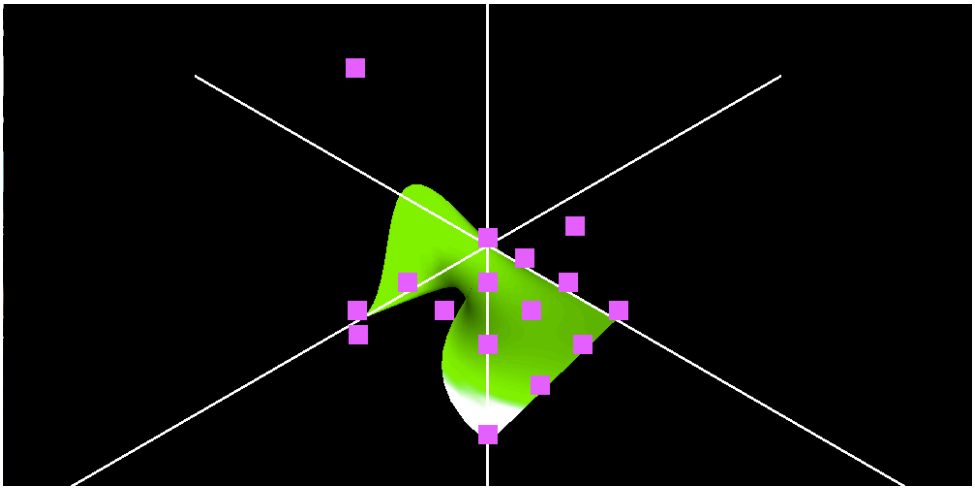


Figure 9: Increasing Shine

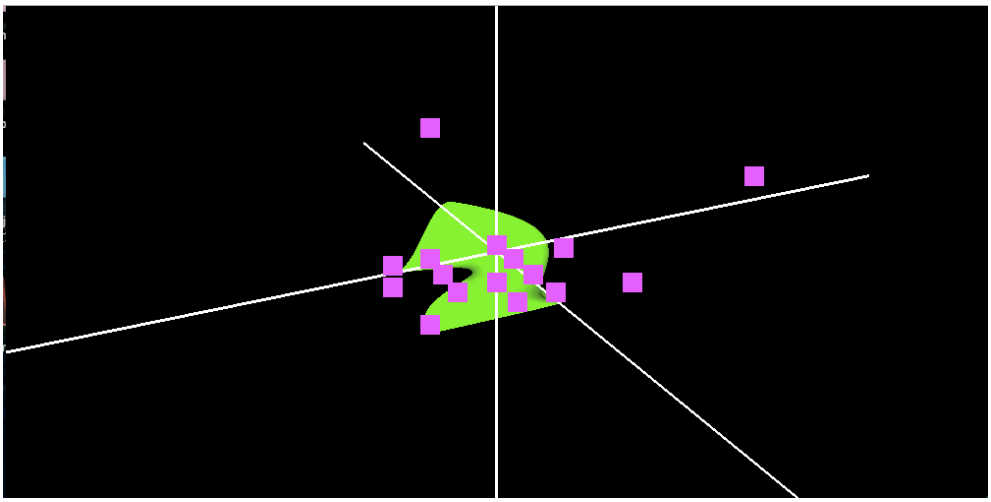


Figure 10: Changing The Camera View

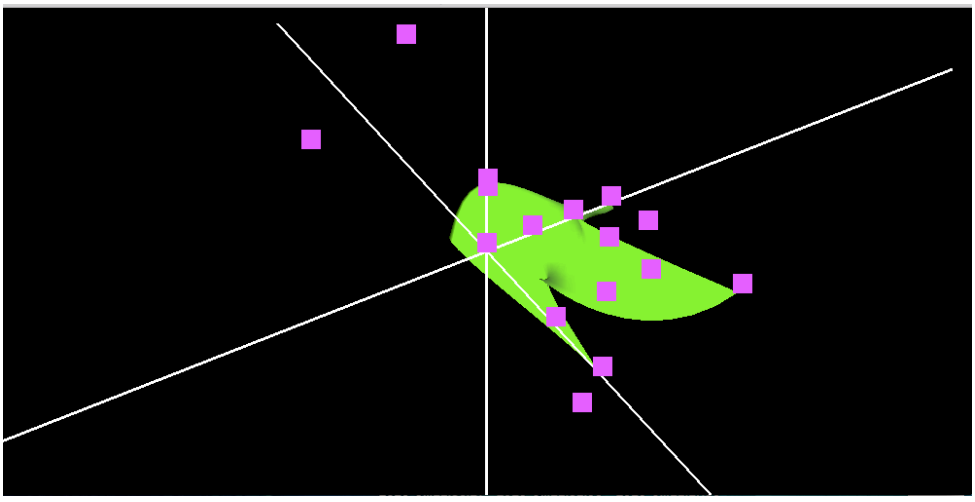


Figure 11: Changing The Camera View

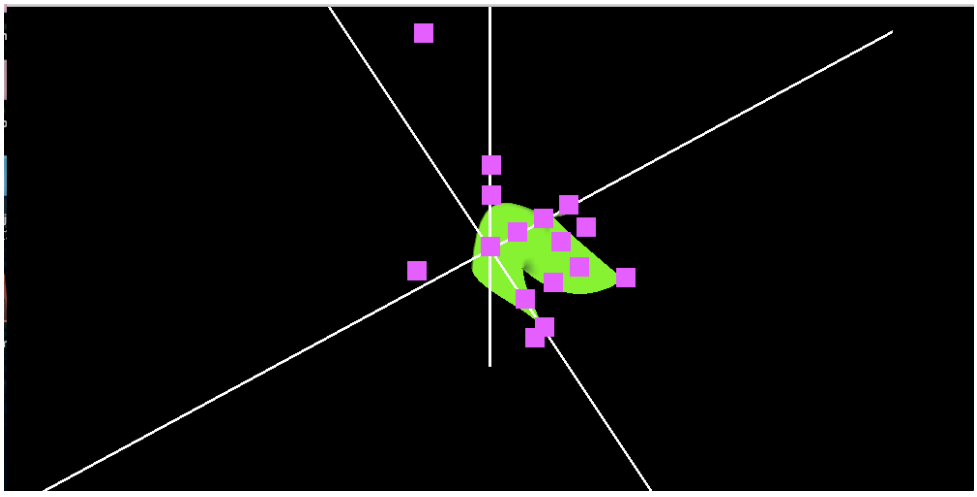


Figure 12: Changing The Camera View

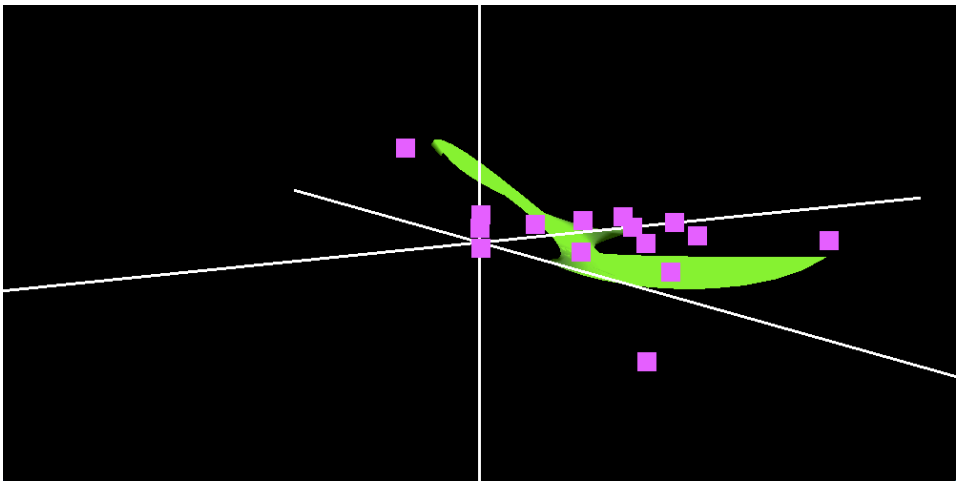


Figure 13: Changing The Camera View

How To Run

Compile with : g++ main.cpp -o a.out -framework OpenGL -framework GLUT

Run with: ./a.out