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**CG ASSIGNMENT – 7.1**

**CODE:**

#include <GL/freeglut.h>

#include <cmath>

const int WINDOW\_WIDTH = 800;

const int WINDOW\_HEIGHT = 800;

const int MAX\_DEPTH = 1; // Maximum recursion depth for the snowflake

void drawKochSnowflake(float x1, float y1, float x2, float y2, int depth) {

if (depth == 0) {

// Base case: draw a line segment

glBegin(GL\_LINES);

glVertex2f(x1, y1);

glVertex2f(x2, y2);

glEnd();

} else {

// Recursive case: divide the line segment into four parts and call the function recursively

float deltaX = x2 - x1;

float deltaY = y2 - y1;

float x3 = x1 + deltaX / 3;

float y3 = y1 + deltaY / 3;

float x4 = x1 + 2 \* deltaX / 3;

float y4 = y1 + 2 \* deltaY / 3;

float x5 = (x3 + x4) / 2 + (y4 - y3) \* sqrt(3) / 2;

float y5 = (y3 + y4) / 2 + (x3 - x4) \* sqrt(3) / 2;

// Recursively draw the four line segments

drawKochSnowflake(x1, y1, x3, y3, depth - 1);

drawKochSnowflake(x3, y3, x5, y5, depth - 1);

drawKochSnowflake(x5, y5, x4, y4, depth - 1);

drawKochSnowflake(x4, y4, x2, y2, depth - 1);

}

}

void display() {

glClear(GL\_COLOR\_BUFFER\_BIT);

glColor3f(1.0, 1.0, 1.0); // Set color to white

float centerX = WINDOW\_WIDTH / 2;

float centerY = WINDOW\_HEIGHT / 2;

float radius = WINDOW\_HEIGHT / 3;

// Calculate the initial coordinates of the Koch snowflake triangle

float x1 = centerX - radius \* sqrt(3) / 2;

float y1 = centerY - radius / 2;

float x2 = centerX + radius \* sqrt(3) / 2;

float y2 = y1;

float x3 = centerX;

float y3 = centerY + radius;

// Draw the three line segments of the initial triangle

drawKochSnowflake(x1, y1, x2, y2, MAX\_DEPTH);

drawKochSnowflake(x2, y2, x3, y3, MAX\_DEPTH);

drawKochSnowflake(x3, y3, x1, y1, MAX\_DEPTH);

glFlush();

}

void reshape(int width, int height) {

glViewport(0, 0, width, height);

glMatrixMode(GL\_PROJECTION);

glLoadIdentity();

gluOrtho2D(0, width, 0, height);

}

int main(int argc, char\*\* argv) {

glutInit(&argc, argv);

glutInitDisplayMode(GLUT\_SINGLE | GLUT\_RGB);

glutInitWindowSize(WINDOW\_WIDTH, WINDOW\_HEIGHT);

glutCreateWindow("Koch Snowflake");

glClearColor(0.0, 0.0, 0.0, 1.0); // Set clear color to black

glutDisplayFunc(display);

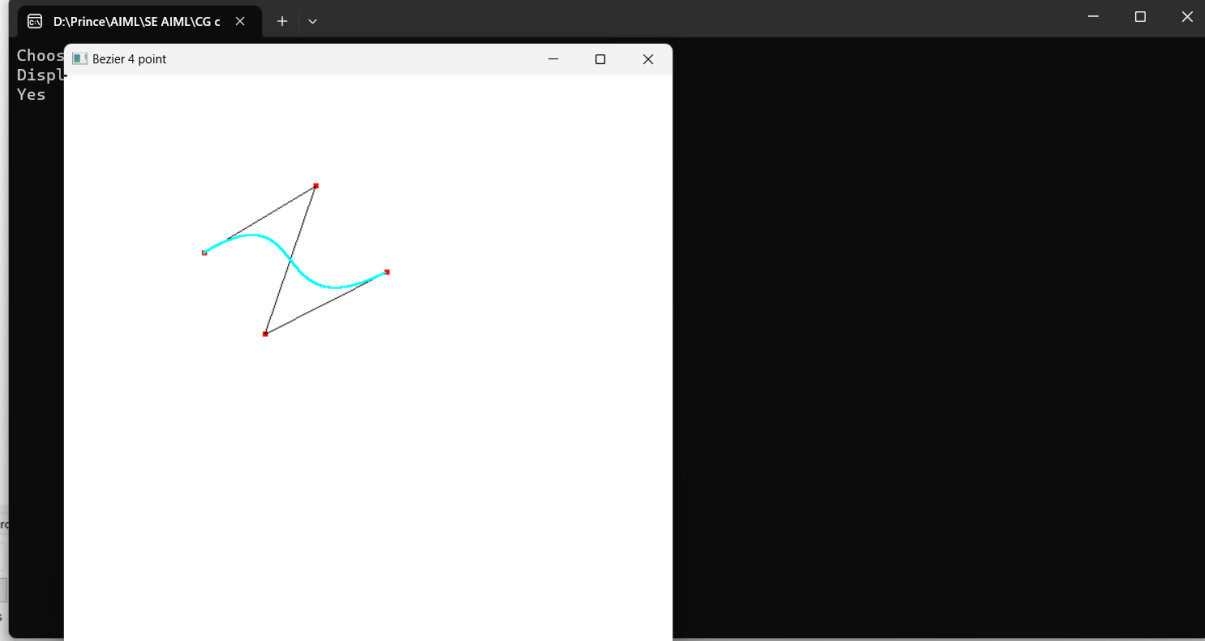
glutReshapeFunc(reshape);

glutMainLoop();

return 0;

}

**OUTPUT:**

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