**Pune Institute Of Computer Technology Dhankawadi,**

**Pune – 43.**

Assignment No. 7

Computer Graphics

**SE-IT-10 ACADEMIC YEAR :- 2020-2021**

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**Topic Name**:

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| Generate fractal patterns using i) Bezier ii) Koch Curve |

Source Code:

#include <iostream>

#include <GL/glut.h>

#include <GL/freeglut.h>

#include <math.h>

using namespace std;

#define RADIAN (3.14/180)

#define XMAX 1400

#define YMAX 900

void Initialize();

void draw();

void draw\_koch(float,float,float,float,int);

void Initialize()

{

glClear(GL\_COLOR\_BUFFER\_BIT);

glClearColor(0.0,0.0,0.0,0.0);

glColor3f(1.0,1.0,1.0);

gluOrtho2D(0.0,XMAX,0.0,YMAX);

}

void draw(int n)

{

glBegin(GL\_LINES);

draw\_koch(600,100,800,400,n);

draw\_koch(800,400,400,400,n);

draw\_koch(400,400,600,100,n);

glEnd();

glFlush();

}

void draw\_koch(float xa,float ya,float xb,float yb,int n)

{

float xc,xd,yc,yd,midx,midy;

xc = (2\*xa+xb)/3;

yc = (2\*ya+yb)/3;

xd = (2\*xb+xa)/3;

yd = (2\*yb+ya)/3;

midx = xc + ((xd-xc)\*cos(60\*RADIAN)) + ((yd-yc)\*sin(60\*RADIAN));

midy = yc - ((xd-xc)\*sin(60\*RADIAN)) + ((yd-yc)\*cos(60\*RADIAN));

if(n>0)

{

draw\_koch(xa,ya,xc,yc,n-1);

draw\_koch(xc,yc,midx,midy,n-1);

draw\_koch(midx,midy,xd,yd,n-1);

draw\_koch(xd,yd,xb,yb,n-1);

}

else

{

glVertex2f(xa,ya);

glVertex2f(xc,yc);

glVertex2f(xc,yc);

glVertex2f(midx,midy);

glVertex2f(midx,midy);

glVertex2f(xd,yd);

glVertex2f(xd,yd);

glVertex2f(xb,yb);

}

}

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

{

int n;

cout<<"\n Enter For How Many Iterations You Want to Draw ?::";

cin>>n;

glutInit( &argc , argv);

glutInitDisplayMode(GLUT\_SINGLE | GLUT\_RGB);

glutInitWindowSize(XMAX,YMAX);

glutInitWindowPosition(0,0);

glutCreateWindow("KOCH CURVE");

Initialize();

draw(n);

glutMainLoop();

return 0;

}

Output:

A picture containing silhouette

Description automatically generated

A picture containing silhouette

Description automatically generated

A picture containing silhouette

Description automatically generated

A picture containing silhouette

Description automatically generated