**Develop a program to demonstrate Animation effects on simple objects.**

#include<GL/glut.h>

#include<stdio.h>

#include<math.h>

#define PI 3.1416

static int win,val=0,CMenu;

void CreateMenu(void);

void Menu(int value);

struct wcPt3D

{

GLfloat x, y, z;

};

GLsizei winWidth = 600, winHeight = 600;

GLfloat xwcMin = 0.0, xwcMax = 130.0;

GLfloat ywcMin = 0.0, ywcMax = 130.0;

void bino(GLint n, GLint \*C)

{

GLint k, j;

for(k=0;k<=n;k++)

{

C[k]=1;

for(j=n;j>=k+1; j--)

C[k]\*=j;

for(j=n-k;j>=2;j--)

C[k]/=j;

}

}

void computeBezPt(GLfloat u,struct wcPt3D \*bezPt, GLint nCtrlPts,struct wcPt3D \*ctrlPts,

GLint \*C)

{

GLint k, n=nCtrlPts-1;

GLfloat bezBlendFcn;

bezPt ->x =bezPt ->y = bezPt->z=0.0;

for(k=0; k< nCtrlPts; k++)

{

bezBlendFcn = C[k] \* pow(u, k) \* pow( 1-u, n-k); bezPt ->x += ctrlPts[k].x \* bezBlendFcn; bezPt ->y += ctrlPts[k].y \* bezBlendFcn;

bezPt ->z += ctrlPts[k].z \* bezBlendFcn;

}

}

void bezier(struct wcPt3D \*ctrlPts, GLint nCtrlPts, GLint nBezCurvePts)

{

struct wcPt3D bezCurvePt;

GLfloat u;

GLint \*C, k;

C= new GLint[nCtrlPts];

bino(nCtrlPts-1, C);

glBegin(GL\_LINE\_STRIP);

for(k=0; k<=nBezCurvePts; k++)

{

u=GLfloat(k)/GLfloat(nBezCurvePts);

computeBezPt(u, &bezCurvePt, nCtrlPts, ctrlPts, C);

glVertex2f(bezCurvePt.x, bezCurvePt.y);

}

glEnd();

delete[]C;

}

void displayFcn()

{

GLint nCtrlPts = 4, nBezCurvePts =20;

static float theta = 0;

struct wcPt3D ctrlPts[4] = {{20, 100, 0},{30, 110, 0},{50, 90, 0},{60, 100, 0}};

ctrlPts[1].x +=10\*sin(theta \* PI/180.0);

ctrlPts[1].y +=5\*sin(theta \* PI/180.0);

ctrlPts[2].x -= 10\*sin((theta+30) \* PI/180.0);

ctrlPts[2].y -= 10\*sin((theta+30) \* PI/180.0);

ctrlPts[3].x-= 4\*sin((theta) \* PI/180.0);

ctrlPts[3].y += sin((theta-30) \* PI/180.0);

theta+=0.1;

glClear(GL\_COLOR\_BUFFER\_BIT);

glColor3f(1.0, 1.0, 1.0);

glPointSize(5);

//Indian Flag

if(val==1){

glPushMatrix();

glLineWidth(5);

glColor3f(1.0,0.5,0); //Indian flag: Orange color code

for(int i=0;i<8;i++)

{

glTranslatef(0, -0.8, 0);

bezier(ctrlPts, nCtrlPts, nBezCurvePts);

}

glColor3f(1,1,1); //Indian flag: white color code

for(int i=0;i<8;i++)

{

glTranslatef(0, -0.8, 0);

bezier(ctrlPts, nCtrlPts, nBezCurvePts);

}

glColor3f(0,1.0,0); //Indian flag: green color code

for(int i=0;i<8;i++)

{

glTranslatef(0, -0.8, 0);

bezier(ctrlPts, nCtrlPts, nBezCurvePts);

}

glPopMatrix();

glColor3f(0.7, 0.5,0.3);

glLineWidth(5);

glBegin(GL\_LINES);

glVertex2f(20,100);

glVertex2f(20,40);

glEnd();

glFlush();

}

//Karnataka Flag

if(val==2){

glPushMatrix();

glLineWidth(5);

glColor3f(1.0, 1.0, 0.0); //Karnataka flag: Yellow color code

for(int i=0;i<12;i++)

{

glTranslatef(0, -0.8, 0);

bezier(ctrlPts, nCtrlPts, nBezCurvePts);

}

glColor3f(1, 0.0, 0.0); //Karnataka flag: Red color code

for(int i=0;i<12;i++)

{

glTranslatef(0, -0.8, 0);

bezier(ctrlPts, nCtrlPts, nBezCurvePts);

}

glPopMatrix();

glColor3f(0.7, 0.5,0.3);

glLineWidth(5);

glBegin(GL\_LINES);

glVertex2f(20,100);

glVertex2f(20,40);

glEnd();

glFlush();

}

glutPostRedisplay();

glutSwapBuffers();

}

void winReshapeFun(GLint newWidth, GLint newHeight)

{

glViewport(0, 0, newWidth, newHeight);

glMatrixMode(GL\_PROJECTION);

glLoadIdentity();

gluOrtho2D(xwcMin, xwcMax, ywcMin, ywcMax); glClear(GL\_COLOR\_BUFFER\_BIT); }

void CreateMenu(void)

{

CMenu= glutCreateMenu(Menu);//Creaate Menu Option

glutAddMenuEntry("Indian Flag",1);

glutAddMenuEntry("Karnataka Flag",2);

glutAddMenuEntry("Exit",0);

glutAttachMenu(GLUT\_RIGHT\_BUTTON);

}

void Menu(int value)

{

if(value==0)

{

glutDestroyWindow(win);

exit(0);

}

else {

val=value;

}

}

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

{

glutInit(&argc, argv);

glutInitDisplayMode(GLUT\_DOUBLE | GLUT\_RGB);

glutInitWindowPosition(50, 50);

glutInitWindowSize(winWidth, winHeight);

glutCreateWindow("Prg. 8 Bezier Curve");

CreateMenu();

glutDisplayFunc(displayFcn);

glutReshapeFunc(winReshapeFun);

glutMainLoop();

}

 

