**2.**

#include<gl/glut.h>

#include<stdio.h>

#include<math.h>

int xc, yc, r;

int rx, ry, xce, yce;

void draw\_circle(int xc, int yc, int x, int y)

{

glBegin(GL\_POINTS);

glVertex2i(xc + x, yc + y);

glVertex2i(xc - x, yc + y);

glVertex2i(xc + x, yc - y);

glVertex2i(xc - x, yc - y);

glVertex2i(xc + y, yc + x);

glVertex2i(xc - y, yc + x);

glVertex2i(xc + y, yc - x);

glVertex2i(xc - y, yc - x);

glEnd();

}

void circlebres()

{

glClear(GL\_COLOR\_BUFFER\_BIT);

int x = 0, y = r;

int d = 3 - 2 \* r;

while (x <= y)

{

draw\_circle(xc, yc, x, y);

x++;

if (d < 0)

d = d + 4 \* x + 6;

else

{

y--;

d = d + 4 \* (x - y) + 10;

}

draw\_circle(xc, yc, x, y);

}

glFlush();

}

int p1\_x, p2\_x, p1\_y, p2\_y;

int point1\_done = 0;

void myMouseFunccircle(int button, int state, int x, int y)

{

if (button == GLUT\_LEFT\_BUTTON && state == GLUT\_DOWN && point1\_done == 0)

{

p1\_x = x - 250;

p1\_y = 250 - y;

point1\_done = 1;

}

else if (button == GLUT\_LEFT\_BUTTON && state == GLUT\_DOWN)

{

p2\_x = x - 250;

p2\_y = 250 - y;

xc = p1\_x;

yc = p1\_y;

float exp = (p2\_x - p1\_x) \* (p2\_x - p1\_x) + (p2\_y - p1\_y) \* (p2\_y - p1\_y);

r = (int)(sqrt(exp));

circlebres();

point1\_done = 0;

}

}

/////ELLIPSE/////////////

void draw\_ellipse(int xce, int yce, int x, int y)

{

glBegin(GL\_POINTS);

glVertex2i(x + xce, y + yce);

glVertex2i(-x + xce, y + yce);

glVertex2i(x + xce, -y + yce);

glVertex2i(-x + xce, -y + yce);

glEnd();

}

void midptellipse()

{

glClear(GL\_COLOR\_BUFFER\_BIT);

float dx, dy, d1, d2, x, y;

x = 0;

y = ry;

// Initial decision parameter of region 1

d1 = (ry \* ry) - (rx \* rx \* ry) +

(0.25 \* rx \* rx);

dx = 2 \* ry \* ry \* x;

dy = 2 \* rx \* rx \* y;

// For region 1

while (dx < dy)

{

// Print points based on 4-way symmetry

draw\_ellipse(xce, yce, x, y);

// Checking and updating value of

// decision parameter based on algorithm

if (d1 < 0)

{

x++;

dx = dx + (2 \* ry \* ry);

d1 = d1 + dx + (ry \* ry);

}

else

{

x++;

y--;

dx = dx + (2 \* ry \* ry);

dy = dy - (2 \* rx \* rx);

d1 = d1 + dx - dy + (ry \* ry);

}

}

// Decision parameter of region 2

d2 = ((ry \* ry) \* ((x + 0.5) \* (x + 0.5))) +

((rx \* rx) \* ((y - 1) \* (y - 1))) -

(rx \* rx \* ry \* ry);

// Plotting points of region 2

while (y >= 0)

{

// Print points based on 4-way symmetry

draw\_ellipse(xce, yce, x, y);

// Checking and updating parameter

// value based on algorithm

if (d2 > 0)

{

y--;

dy = dy - (2 \* rx \* rx);

d2 = d2 + (rx \* rx) - dy;

}

else

{

y--;

x++;

dx = dx + (2 \* ry \* ry);

dy = dy - (2 \* rx \* rx);

d2 = d2 + dx - dy + (rx \* rx);

}

}

glFlush();

}

int p1e\_x, p2e\_x, p1e\_y, p2e\_y, p3e\_x, p3e\_y;

int point1e\_done = 0;

void myMouseFunc(int button, int state, int x, int y)

{

if (button == GLUT\_LEFT\_BUTTON && state == GLUT\_DOWN && point1e\_done == 0)

{

p1e\_x = x - 250;

p1e\_y = 250 - y;

xce = p1e\_x;

yce = p1e\_y;

point1e\_done = 1;

}

else if (button == GLUT\_LEFT\_BUTTON && state == GLUT\_DOWN && point1e\_done == 1)

{

p2e\_x = x - 250;

p2e\_y = 250 - y;

float exp = (p2e\_x - p1e\_x) \* (p2e\_x - p1e\_x) + (p2e\_y - p1e\_y) \* (p2e\_y - p1e\_y);

rx = (int)(sqrt(exp));

//midptellipse();

point1e\_done = 2;

}

else if (button == GLUT\_LEFT\_BUTTON && state == GLUT\_DOWN && point1e\_done == 2)

{

p3e\_x = x - 250;

p3e\_y = 250 - y;

float exp = (p3e\_x - p1e\_x) \* (p3e\_x - p1e\_x) + (p3e\_y - p1e\_y) \* (p3e\_y - p1e\_y);

ry = (int)(sqrt(exp));

midptellipse();

point1e\_done = 0;

}

}

void myDrawing()

{ }

void myDrawingc()

{ }

void minit()

{

glClearColor(1, 1, 1, 1);

glColor3f(1.0, 0.0, 0.0);

glPointSize(3.0);

gluOrtho2D(-250, 250, -250, 250);

}

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

{

glutInit(&argc, argv);

glutInitDisplayMode(GLUT\_SINGLE | GLUT\_RGB);

glutInitWindowSize(500, 500);

glutInitWindowPosition(0, 0);

/\*

//FOR MOUSE

int id1 = glutCreateWindow("Circle");

glutSetWindow(id1);

glutMouseFunc(myMouseFunccircle);

glutDisplayFunc(myDrawingc);

minit();

glutInitWindowSize(500, 500);

glutInitWindowPosition(600, 100);

int id2 = glutCreateWindow("Ellipse");

glutSetWindow(id2);

glutMouseFunc(myMouseFunc);

glutDisplayFunc(myDrawing);

//END MOUSE

\*/

//FOR KEYBOARD

printf("Enter 1 to draw circle , 2 to draw ellipse\n");

int ch;

scanf\_s("%d", &ch);

switch (ch) {

case 1:

printf("Enter coordinates of centre of circle and radius\n");

scanf\_s("%d%d%d", &xc, &yc, &r);

glutCreateWindow("Circle");

glutDisplayFunc(circlebres);

break;

case 2:

printf("Enter coordinates of centre of ellipse and major and minor radius\n");

scanf\_s("%d%d%d%d", &xce, &yce, &rx, &ry);

glutCreateWindow("Ellipse");

glutDisplayFunc(midptellipse);

break;

}

//END KEYBOARD

minit();

glutMainLoop();

return 0;

}

OUTPUT:



