Experiment -6

**Q1) WAP to draw the ellipse using MId-Point Algorithm.**

**CODE)**

#include <GL/glut.h>

#include <windows.h>

#include <stdio.h>

int rx,ry,xCenter,yCenter;

void myinit(void)

{

glClearColor(1.0,1.0,1.0,0.0);

glMatrixMode(GL\_PROJECTION);

glLoadIdentity();

gluOrtho2D (0.0,640.0,0.0,480.0);

}

void setPixel(GLint x,GLint y)

{

glBegin(GL\_POINTS);

glVertex2i(x,y);

glEnd();

}

void ellipseMidPoint()

{

//plotting for 1st region of 1st quardant and the slope will be < -1

//----------------------Region-1------------------------//

float x = 0;

float y = ry;//(0,ry) ---

float p1 = ry \* ry - (rx \* rx)\* ry + (rx \* rx) \* (0.25) ;

//slope

float dx = 2 \* (ry \* ry) \* x;

float dy = 2 \* (rx \* rx) \* y;

while(dx < dy)

{

//plot (x,y)

setPixel(xCenter + x , yCenter+y);

setPixel( xCenter - x, yCenter + y);

setPixel( xCenter + x , yCenter - y );

setPixel( xCenter - x , yCenter - y);

if(p1 < 0)

{

x = x + 1;

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

p1 = p1 + dx + (ry \* ry);

}

else

{

x = x + 1;

y = y - 1;

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

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

p1 = p1 + dx - dy +(ry \* ry);

}

}

float p2 = (ry \* ry )\* ( x + 0.5) \* ( x + 0.5) + ( rx \* rx) \* ( y - 1) \* ( y - 1) - (rx \* rx )\* (ry \* ry);

while(y > 0)

{

//plot (x,y)

setPixel(xCenter + x , yCenter+y);

setPixel( xCenter - x, yCenter + y);

setPixel( xCenter + x , yCenter - y );

setPixel( xCenter - x , yCenter - y);

if(p2 > 0)

{

x = x;

y = y - 1;

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

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

p2 = p2 - dy + (rx \* rx);

}

else

{

x = x + 1;

y = y - 1;

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

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

p2 = p2 + dx -

dy + (rx \* rx);

}

}

}

void display()

{

glClear(GL\_COLOR\_BUFFER\_BIT); // clear the screen

glColor3f(1.0,0.0,0.0); // red foreground

glPointSize(2.0); // size of points to be drawin (in pixel)

ellipseMidPoint();

glFlush(); // send all output to the display

}

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

{

printf("\n\nEnter Center Of Ellipse \n\n");

printf("\n x = ");

scanf("%d",&xCenter);

printf("\n y = ");

scanf("%d",&yCenter);

printf(" Enter a Semi Major Axix : ");

scanf("%d",&rx);

printf(" \nEnter a Semi Minor Axis: ");

scanf("%d",&ry);

glutInit(&argc,argv);

glutInitWindowSize(640,480);

glutInitWindowPosition(10,10);

glutInitDisplayMode(GLUT\_SINGLE | GLUT\_RGB);

glutCreateWindow("Midpoint Ellipse Drawing Algorithm");

myinit();

glutDisplayFunc(display);

glutMainLoop();

return 0;

}



