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**B-5 AI&ML SEM-5**

**Experiment-4**

**Midpoint Ellipse**

#include<windows.h>

#include<GL\glew.h>

#include<GL\glut.h>

#include <stdio.h>

int x,y,rx,ry,xc,yc;

void display()

{

glColor3f(1.0, 0.0, 0.0); //Quadrant Plot Graph

glBegin(GL\_LINES);

glVertex2i(-50, 0);

glVertex2i(50, 0);

glVertex2i(0, -50);

glVertex2i(0, 50);

glEnd();

glBegin(GL\_POINTS);

glColor3f(1.0,0.0,0.0);

glPointSize(5.0);

x=0;

y=ry;

float p=ry\*ry-rx\*rx\*ry-(rx\*rx)/4;

while(2\*ry\*ry\*x <=2\*rx\*rx\*y)

{

if(p < 0)

{

x++;

p = p+2\*ry\*ry\*x+ry\*ry;

}

else

{

x++;

y--;

p = p+2\*ry\*ry\*x-2\*rx\*rx\*y-ry\*ry;

}

glPointSize(5.0);

glVertex2i(xc+x,yc+y);

glVertex2i(xc+x,yc-y);

glVertex2i(xc-x,yc+y);

glVertex2i(xc-x,yc-y);

printf("%.2f, %.2f \n",(xc+x),(yc+y));

printf("%.2f, %.2f \n",(xc+x),(yc-y));

printf("%.2f, %.2f \n",(xc-x),(yc+y));

printf("%.2f, %.2f \n",(xc-x),(yc-y));

}

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

while(y > 0)

{

if(p2 <= 0)

{

x++;

y--;

p2 = p2+2\*ry\*ry\*x-2\*rx\*rx\*y+rx\*rx;

}

else

{

y--;

p2 = p2-2\*rx\*rx\*y+rx\*rx;

}

glPointSize(5.0);

glVertex2i(xc+x,yc+y);

glVertex2i(xc+x,yc-y);

glVertex2i(xc-x,yc+y);

glVertex2i(xc-x,yc-y);

printf("%.2f, %.2f \n",(xc+x),(yc+y));

printf("%.2f, %.2f \n",(xc+x),(yc-y));

printf("%.2f, %.2f \n",(xc-x),(yc+y));

printf("%.2f, %.2f \n",(xc-x),(yc-y));

}

glEnd();

glFlush();

}

void init()

{

glClearColor(0.7, 0.7, 0.7, 0.7);

glMatrixMode(GL\_PROJECTION);

glLoadIdentity();

gluOrtho2D(-50, 50, -50, 50);

}

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

{

printf("Enter the coordinates of the ellipse centre:");

scanf("%d %d",&xc,&yc);

printf("Enter the value of rx : ");

scanf("%d",&rx);

printf("Enter the value of ry : ");

scanf("%d",&ry);

glutInit(&argc, argv);

glutInitDisplayMode(GLUT\_RGB | GLUT\_SINGLE);

glutInitWindowSize(500, 500);

glutInitWindowPosition(100, 100);

glutCreateWindow("Midpoint Ellipse");

init();

glutDisplayFunc(display);

glutMainLoop();

}

