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program-2

Write a program to generate a circle and ellipse using Bresenham's circle drawing and ellipse drawing technique. Use two windows to draw circle in one window and ellipse in other window. User can specify inputs through keyboard/mouse.

```
#include<gl/glut.h>
#include<stdio.h>
#include<math.h>

int xc,yc,r;
int rx,ry,xcc,ycc;

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();
}
```

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```
void circle_bres()
{
    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 myMouseFunc1rcle(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;
    }
```

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```
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;
    }
}

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;
```

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```
d1 = (ry*ry) - (rx*rx*ry) +
        (0.25*rx*rx);

dx = 2*ry*ry*x;
dy = 2*rx*rx*y;

while (dx<dy)
{
    draw_ellipse(xcc, ycc, x, y);
    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);
    }
}
d2 = ((ry*ry)*((x+0.5)*(x+0.5)))+((rx*rx)*((y-1)*
        (y-1)))-(rx*rx*ry*ry);
```

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```
while(y>=0)
{
    draw_ellipse(xcc, ycc, x, y);
    if (d2>0)
    {
        y--;
        dy = dy - (2*ry*ry);
        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 p1c_x, p2c_x, p1c_y, p2c_y, p3c_x, p3c_y;
int pointc_done=0;
void myMouseFunc(int button, int state, int x, int y)
{
    if (buton == GLUT_LEFT_BUTTON && state == GLUT_DOWN
                && pointc_done == 0)
    {
        p1c_x = x-250;
        p1c_y = 250-y;
        xcc = p1c_x;
        ycc = p1c_y;
```

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```
        point1_done=1;
    }
else if (button==GLUT_LEFT_BUTTON && state==GLUT_DOWN &&
                point1_done==1)
    {
        p2c_x = x-250;
        p2c_y = 250-y;
        float exp=(p2c_x-p1c_x)*(p2c_x-p1c_x)+
                (p2c_y-p1c_y)*(p2c_y-p1c_y);
        rx = (int)(sqrt(exp));
        point1_done=2;
    }
else if (button==GLUT_LEFT_BUTTON && state==GLUT_DOWN &&
            point1_done==2)
    {
        p3c_x = x-250;
        p3c_y=250-y;
        float exp = (p3c_x-p1c_x)*(p3c_x-p1c_x)+
                (p3c_y-p1c_y)*(p3c_y-p1c_y);
        rx = (int)(sqrt(exp));
        midMidPt();
        point1_done = 0;
    }
}
```

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```
void myDrawing1();
void myDrawing2();

void main1()
{
    glClearColor(1,1,1,1);
    glColor3f(1.0,0.0,0.0);
    glPointSize(3.0);
    gluOrtho2D(-250,250,-250,250);
}

void main(int argc, char* argv[])
{
    glutInit(&argc, argv);
    glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB);
    glutWindowSize(500,500);
    glutWindowPosition(0,0);

printf("Enter 1 to draw circle, 2 to draw ellipse");
    int ch;
    scanf("%d", &ch);
    switch(ch)
    {
      case 1:
          printf("Enter coordinates of Centre of circle and
                  radius\n");
          scanf("%d%d%d", &xc, &yc, &r);
          glutCreateWindow("Circle");
```

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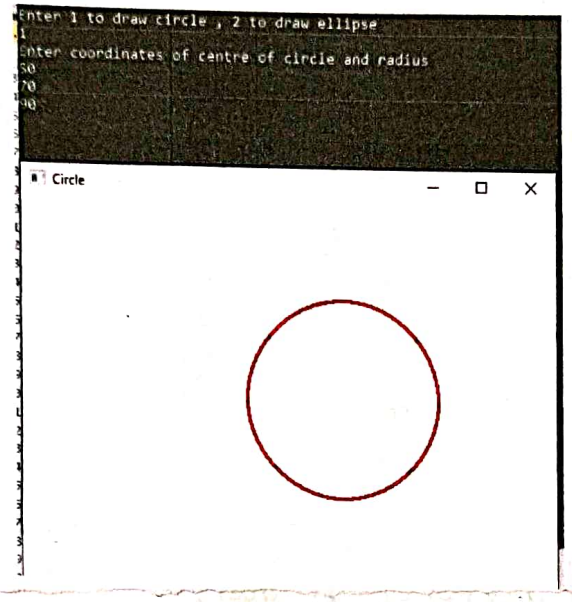
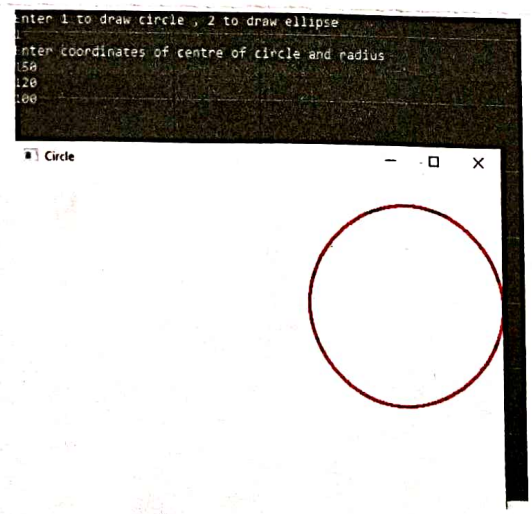
```
        glutDisplayFunc(circleBres);
        break;

    case 2 :
        printf("Enter coordinates of centre of Ellipse and major and
                minor radius\n");
        scanf_s("%d%d%d%d", &xcc, &ycc, &rx, &ry);
        glutCreateWindow("Ellipse");
        glutDisplayFunc(midptEllipse);
        break;
    }
    init();
    glutMainLoop();
}
```


Enter 1 to draw circle , 2 to draw ellipse
1
Enter coordinates of centre of circle and radius
150
170
100
Circle


Enter 1 to draw circle , 2 to draw ellipse
Enter coordinates of centre of circle and radius
150
120
100
Circle