Ellipse Drawing: Polar and Non Polar

Code:

```python
from OpenGL.GL import *
from OpenGL.GLU import *
from OpenGL.GLUT import *
import sys
import math


WINDOW_SIZE = 500
SCALE = 100
xc = yc = 0
rx = ry = 1
def polar_ellipse():
    glClear(GL_COLOR_BUFFER_BIT)
    glColor3f(1, 0, 0)
    glPointSize(5)
    glBegin(GL_POINTS)
    global xc, yc, rx, ry
    theta = 0.0
    while theta <= 1.57:
        x = float(rx) * math.cos(theta)
        y = float(ry) * math.sin(theta)
        plot_symmetric_points(x, y)
        theta += 0.001
    glEnd()
    glFlush()

def non_polar_ellipse():
    glClear(GL_COLOR_BUFFER_BIT)
    glColor3f(1, 0, 0)
    glPointSize(5)
    glBegin(GL_POINTS)
    global xc, yc, rx, ry
    x = 0
```

```python
    while x <= rx:
        y = ry * math.sqrt(1 - ((x * x) / (rx * rx)))
        plot_symmetric_points(x, y)
        x += 0.01
    glEnd()
    glFlush()


def plot_symmetric_points(x, y):
    global xc, yc
    glVertex2f((xc + x) / SCALE, (yc + y) / SCALE)
    glVertex2f((xc + x) / SCALE, (yc - y) / SCALE)
    glVertex2f((xc - x) / SCALE, (yc + y) / SCALE)
    glVertex2f((xc - x) / SCALE, (yc - y) / SCALE)
def no_plot():
    pass


def main():
    glutInit(sys.argv)
    glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB)
    glutInitWindowSize(WINDOW_SIZE, WINDOW_SIZE)
    glutInitWindowPosition(50, 50)
    global xc, yc, rx, ry
    xc = int(input("Enter x coordinate of the centre "))
    yc = int(input("Enter y coordinate of the centre "))
    rx = int(input("Enter length of semimajor axis "))
    ry = int(input("Enter length of semiminor axis "))
    choice = int(input("1. Polar ellipse algorithm\n 2. Non polar ellipse
algorithm\nEnter choice: "))
    if choice == 1:
        glutCreateWindow("Polar ellipse drawing algorithm")
        glutDisplayFunc(polar_ellipse)
    elif choice == 2:
        glutCreateWindow("Nonpolar ellipse drawing algorithm")
        glutDisplayFunc(non_polar_ellipse)
    else:
        print("Invalid option!")
        glutCreateWindow("Invalid option")
```

```
        glutDisplayFunc(no_plot)
    glutMainLoop()
main()
```

Output:

1.

Enter x coordinate of the centre 10

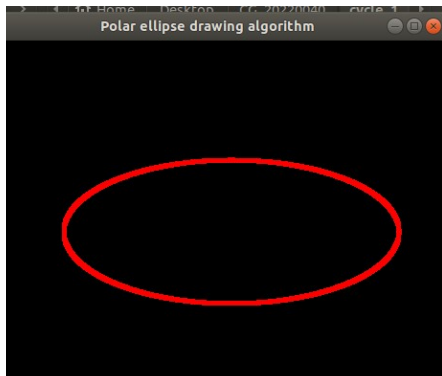Enter y coordinate of the centre 20

Enter length of semimajor axis 70

Enter length of semiminor axis 30

1. Polar ellipse algorithm

2. Non polar ellipse algorithm

Enter choice: 1

2.

Enter x coordinate of the centre 10

Enter y coordinate of the centre 20

Enter length of semimajor axis 40

Enter length of semiminor axis 70

1. Polar ellipse algorithm

2. Non polar ellipse algorithm

Enter choice: 2