Algorithm for Ellipse Drawing (Midpoint Algorithm)

Step 1:

Input the ellipse parameters:

- Radii: rx, ry

- Center coordinates: xc, yc

Step 2:

Initialize variables for the starting point of the ellipse:

- $x_0 = 0$

- $y_0 = ry$

Step 3:

Calculate the decision parameter for Region 1:

$P_1 = (ry^2) - (rx^2 \cdot ry) + (0.25 \cdot rx^2)$

Step 4:

Repeat until $2 \cdot ry^2 \cdot x \leq 2 \cdot rx^2 \cdot y$:

- Add the symmetric points to the lists:

(x + xc, y + yc), (-x + xc, y + yc), (x + xc, -y + yc), (-x + xc, -y + yc)

- Update x, y and P_1:

  - If $P_1 < 0$:

    $x = x + 1$

    $P_1 = P_1 + 2 \cdot ry^2 \cdot x + ry^2$

  - Else:

    $x = x + 1, y = y - 1$

    $P_1 = P_1 + 2 \cdot ry^2 \cdot x - 2 \cdot rx^2 \cdot y + ry^2$

Step 5:

Calculate the decision parameter for Region 2:

$P_2 = (ry^2 \cdot (x + 0.5)^2) + (rx^2 \cdot (y - 1)^2) - (rx^2 \cdot ry^2)$

Step 6:

Repeat until $y \geq 0$:

- Add the symmetric points to the lists:

$(x + xc, y + yc), (-x + xc, y + yc), (x + xc, -y + yc), (-x + xc, -y + yc)$

- Update x, y and P_2:

  - If $P_2 > 0$:

    $y = y - 1$

    $P_2 = P_2 - 2 \cdot rx^2 \cdot y + rx^2$

  - Else:

    $x = x + 1, y = y - 1$

    $P_2 = P_2 + 2 \cdot ry^2 \cdot x - 2 \cdot rx^2 \cdot y + rx^2$

Step 7:

Plot all the points to visualize the ellipse.