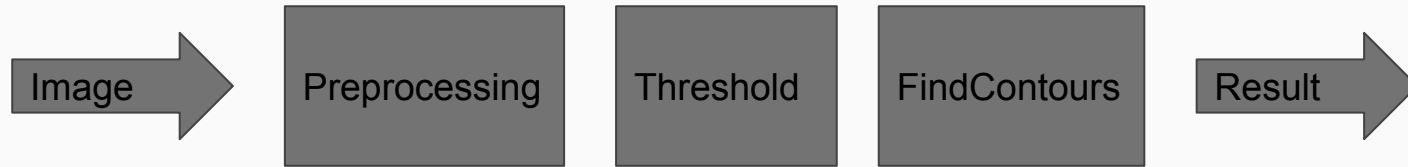


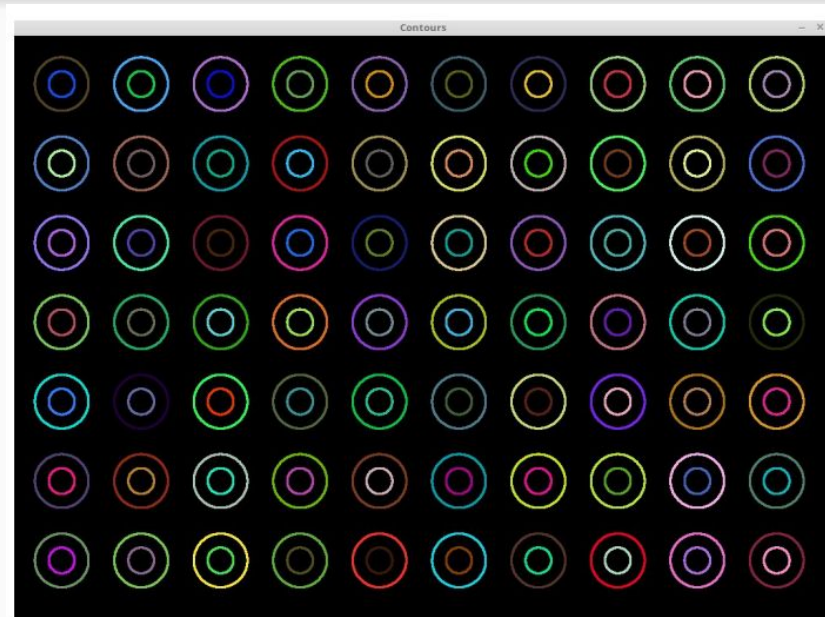
# Camera Calibration using OpenCV



# Pipeline



# Preprocessing



# Find Centers: Center of mass

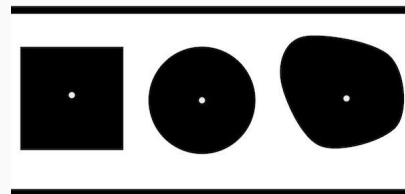
Two options:

- Center of mass

Image Moments

$$C_x = \frac{M_{10}}{M_{00}}$$

$$C_y = \frac{M_{01}}{M_{00}}$$



# Find Centers: Center of mass

Two options:

- Ellipse fitting

$$F(\mathbf{a}, \mathbf{p}) = \mathbf{a} \cdot \mathbf{p} = ax^2 + bxy + cy^2 + dx + ey + f$$

$$x_{center} = 2cd - be / (b^2 - 4ac)$$

$$y_{center} = 2ae - bd / (b^2 - 4ac)$$

# Draw lines

