# Step 1: Install OpenCV (if not already)

!pip install opencv-python-headless

# Step 2: Import libraries

import cv2

import numpy as np

from matplotlib import pyplot as plt

from google.colab import files

# Step 3: Upload an image

print("Upload a binary or grayscale image:")

uploaded = files.upload()

image\_path = next(iter(uploaded))

# Step 4: Read the image

img = cv2.imread(image\_path, cv2.IMREAD\_GRAYSCALE)

# Step 5: Threshold (if needed) to make binary

# Convert grayscale to binary (0 or 255)

\_, binary = cv2.threshold(img, 127, 255, cv2.THRESH\_BINARY)

# Step 6: Define kernel (structuring element)

kernel = np.ones((5, 5), np.uint8) # 5x5 square kernel

# Step 7: Apply erosion

eroded = cv2.erode(binary, kernel, iterations=1)

# Step 8: Show results

plt.figure(figsize=(10, 5))

plt.subplot(1, 2, 1)

plt.imshow(binary, cmap='gray')

plt.title('Original Binary Image')

plt.axis('off')

plt.subplot(1, 2, 2)

plt.imshow(eroded, cmap='gray')

plt.title('Eroded Image')

plt.axis('off')

plt.show()

# Step 9: Save the output

cv2.imwrite("eroded\_output.jpg", eroded)

print("Saved as eroded\_output.jpg")

