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Experiment 12

Code

```
import cv2 import

numpy as np

from google.colab.patches import cv2_imshow # Load the image image =

cv2.imread('/content/smoothening data.png', 0) # Load as grayscale

# Define the kernel (structuring element)  kernel

= np.ones((5, 5), np.uint8)

# Perform Erosion

erosion = cv2.erode(image, kernel, iterations=1)

# Perform Dilation

dilation = cv2.dilate(image, kernel, iterations=1) # Perform

Opening (Erosion followed by Dilation) opening =

cv2.morphologyEx(image, cv2.MORPH_OPEN, kernel)

# Perform Closing (Dilation followed by Erosion) closing =

cv2.morphologyEx(image, cv2.MORPH_CLOSE, kernel)

# Display the original image and the results

cv2_imshow(image) cv2_imshow(erosion)

cv2_imshow(dilation)

cv2_imshow(opening)

cv2_imshow(closing)

# Wait for a key press and then close the windows
cv2.waitKey(0) cv2.destroyAllWindows()
```

Output