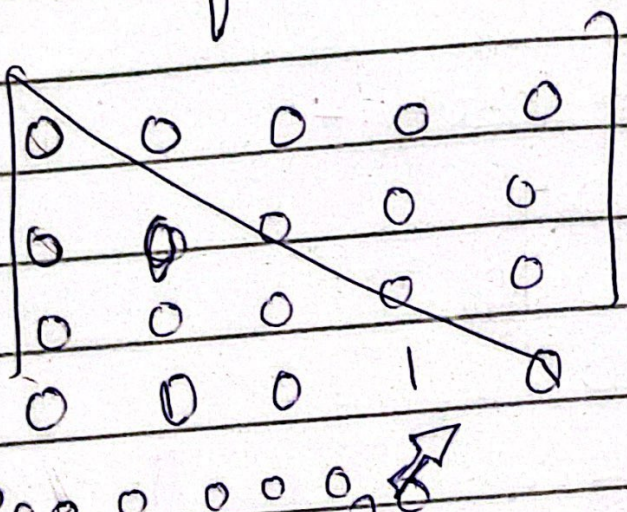
M-Abdullah Nawaz i21-1393 CS-7A
DIP

Graded Online class Exercise

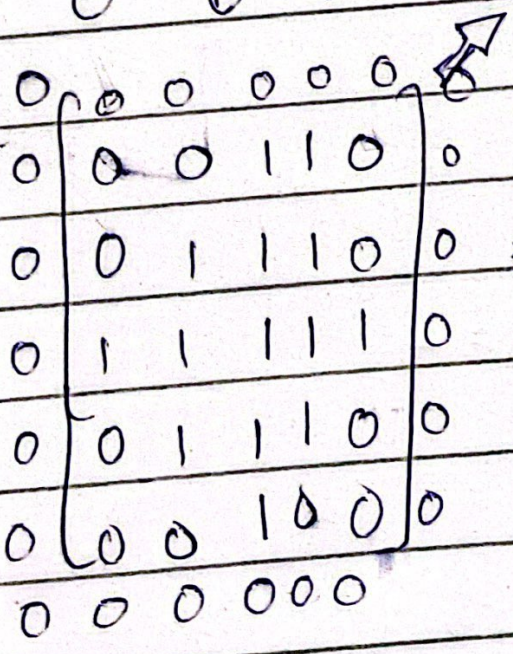
Exercise 1:- A Binary Image (5×5 Grid)
Structuring Element: (3×3) Square = $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$

TASK1: Apply Erosion:
Hit = 0, Fit = 1, Miss = 0
Result for erosion after adding padding for 2



$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$

∴ erosion Result



TASK: 2 Result:-
Dilation:-

$\begin{bmatrix} 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 \end{bmatrix}$

Exercise: 2 Opening Operation

0	0	0	0	0	0	0
0	0	0	1	0	0	0
0	0	1	1	1	0	0
0	1	1	1	1	1	0
0	0	1	1	0	0	0
0	0	0	1	0	0	0
0	0	0	0	0	0	0

Structuring element =

1	1
1	1

Erosion Result :-

=

0	0	0	0	0	0
0	0	0	0	0	0
0	1	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Now apply dilation on it :-

1	1	1	0	0
1	1	1	0	0
1	1	0	0	0
0	0	0	0	0
0	0	0	0	0

dilation Result.

Exercise 3

0	0	0	0	0	0	0	0
0	0	1	1	0	0	0	1 1 1
0	1	1	0	1	0	0	1 1 1
0	1	0	0	1	1	0	1 1 1
0	1	1	1	1	0	0	
0	0	0	1	0	0	0	
0	0	0	0	0	0	0	

Dilation =

0	0	0	0	0	0	0
0	1	1	1	1	1	0
0	1	1	1	1	1	0
0	1	1	1	1	1	0
0	1	1	1	1	1	0
0	1	1	1	1	1	0
0	0	0	0	0	0	0

Now Apply erosion on it :-

0	0	0	0	0
0	1	1	1	0
0	1	1	1	0
0	1	1	1	0
0	0	0	0	0

Exercise 4 :-

:- Here is the 6d for each step with the code given :-

```
import CV2
import numpy as np
import matplotlib.pyplot as plt
image = CV2.imread('coin. image.png',
    CV2.IMREAD_GRAYSCALE) ----
Kernel = np.ones((3,3), np.uint8)
opened_image = CV2.morphologyEx(binary_image,
CV2.MORPH_OPEN, Kernel)
closed_image = CV2.morpologyEx(opened_image,
CV2.MORPH_CLOSE, Kernel)

PLT.figure(figsize(10,8))
Plt.subplot(1,3,1)
Plt.title('Original Image')
plt.imshow(opened_image, Cmap='Gray')
plt.axis('off')

plt.subplot(1,3,3)
plt.title('After closing')
plt.imshow closed_image, Cmap='gray')
plt.axis('off')

plt.show.
```