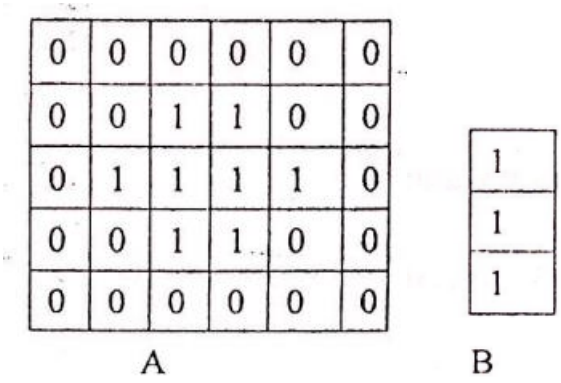
Image Processing and Pattern Recognition

Assignment 2

1. What is the role of Gradient Operator in image processing? Compare and explain the Robert-cross operator, Prewitt operator and Sobel operator.
2. Compare and explain Dilation and Erosion in image processing with necessary equations and suitable figures.
3. How Dilation and Erosion are used for opening and closing operations in image processing? Explain with necessary equations and suitable figures.
4. Perform Dilation and Erosion operation for the following image A with structuring element B.



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

A

1
1
1

B

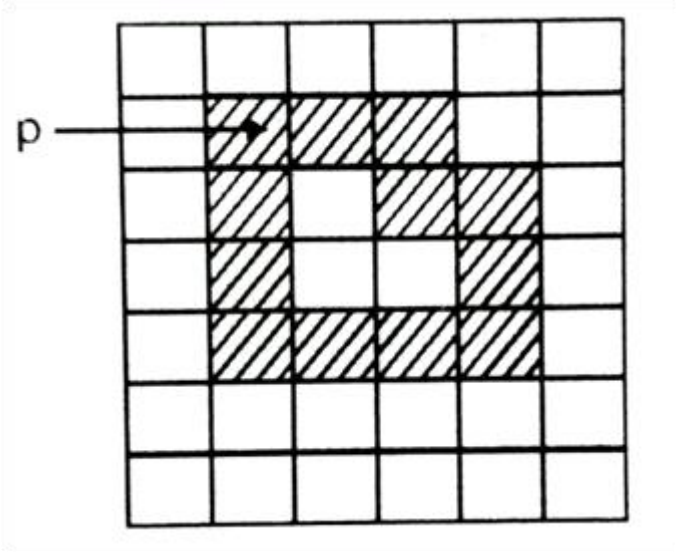
5. What is image segmentation? List down the approaches for image segmentation.
6. How can we use Gradient Operators in image segmentation?
7. Edge linking is usetfu1 in boundary detection of an image? Justify. Explain the method of edge linking using Hough Transform in detail with suitable figures.
8. Compare the Image Segmentation by local thresholding and c global thresholding, adaptive thresholding.

9. State an algorithm for Region based Image segmentation? Use this segmentation algorithm for the following image.

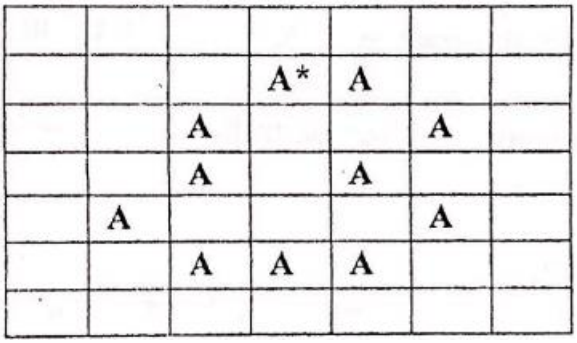
1	1	5	6	5	5
2	1	6	7	4	6
3	2	7	4	6	7
1	0	5	5	7	6
2	0	4	6	8	5
0	1	6	4	5	8

Original Image

10. What is image representation and description? List down different types for image descriptors with a brief examples.
11. What is chain code and shape number? Discuss about 4-direction and 8-directional chain code with an example.
12. Calculate the 4-direction chain code and shape number for the following image with p as starting point.



13. Given an image, "A11 represents its pixel position. If A* is the starting pixel, write down the 8-chain code and find shape number of it.



14. What is neural network? Explain how it can be used for image processing and pattern recognition.
15. Discuss about. Explain briefly about spatial and transform in features of digital image
16. What is pattern recognition? Briefly explain the steps and applications for pattern recognition.
17. Write Short notes on
    a. Laplacian filter for edge detection
    b. Fourier Descriptors
    c. Patterns and Patterns Classes
    d. Supervised Vs Unsupervised Classification
    e. Hamming Vs Hopfield Neural Networks
    f. Morphological Opening and Closing