

ESTIN

Pattern recognition for image analysis

S5 (DS-AI)

2024-2025

TD° 01

Part1:

1- Let $V = \{2,3\}$ be the set of intensity values used to define adjacency.

- In the following images, are p and q **m-adjacent**?

3	1	3
3	(q)2	4
(p)2	0	1

(a)

3	1	3(q)
3	(p)2	4
2	0	1

(b)

2- Let $V = \{2,3\}$

- Does the 4-, 8-, m-path exist between p and q in the following image?

3	1	1	3(q)
1	3	2	4
3	2	1	4
2(p)	0	0	1

3- Let $V = \{2,3,5\}$

- Find p and q pixels 4-, 8-, m-path in the following image

4	5	6	4	5	4
3	5	3	4	3(q)	4
4	4	4	2	4	3
5	3	4	3	3	5
6	3(p)	2	3	4	6
5	4	5	3	3	6

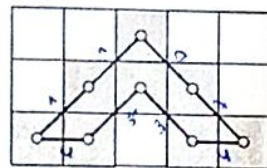
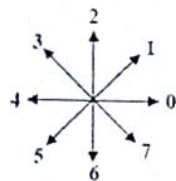
4- Let $V = \{1\}$

Find the connected component based on 4-, 8-adjacency in the following image:

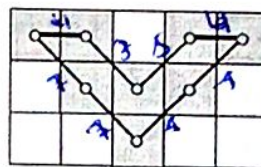
1	1	0	0
1	1	0	0
0	0	1	1
0	0	1	1
1	1	0	0

Part2:

- Find the normalized starting point of the code 11076765543322.
- Compute the first difference of the code 0101030303323232212111.
- You are given the 8-directional chain code and the two objects below.



(a)

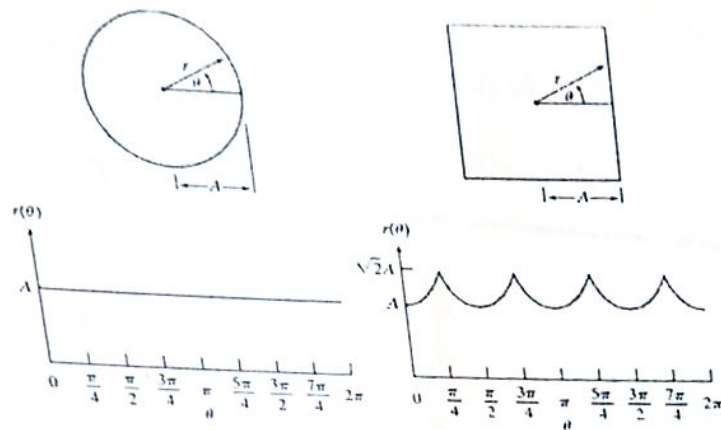


(b)

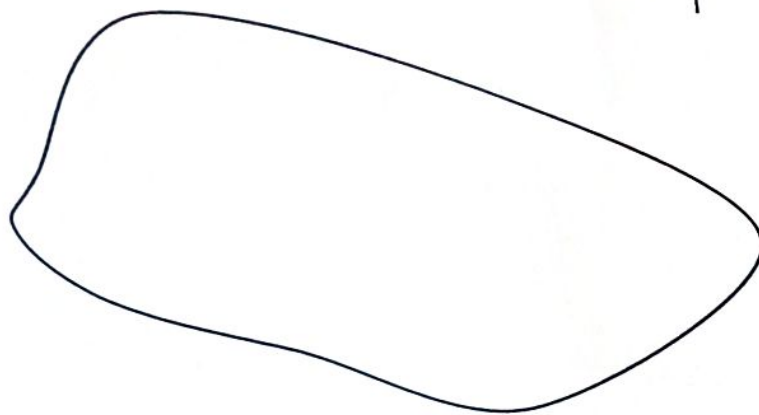
- Chain code the boundary of the A-shaped object clockwise from the lower left pixel.
 - Find the normalized starting point of this code (the sequence of numbers that forms an integer of minimum magnitude). Demonstrate this by starting at the top pixel of the object, instead of the lower left.
 - Normalize the code to rotation and starting point. Demonstrate this by starting at the upper left pixel of the V-shaped object (The V-shaped object (b) is a rotation of the A-shaped object (a)).
4. A) What is the order of the shape number for the figure below?
- B) Obtain the shape number.



5. Give the smallest number of statistical moment descriptors needed to differentiate between the signatures of the following figures



6. Approximate the following shape by a polygon.



Threshold: |