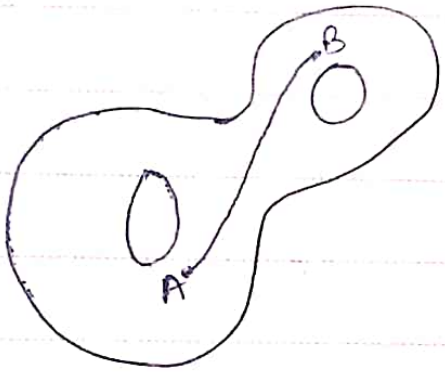
Date:

Segmentating Binary Image:

- Object is a connected components.



A & B are connected if path exists betⁿ A & B along which b(x,y) is constant

- Connected components labelling:

Algorithm:

a. Find the unlabeled 'seed' point (with b=1). which is first point: Terminate if point not found.

b. Assign it a New label. If all previous points are assigned then assign a' new label.

c. Assign same label to its neighbour b=1.

d. Then assign same label to neighbour's of neighbours with b=1. Repeat till no more unlabeled neighbours with b=1.

e. Go back to (a) look for next unlabeled seed.

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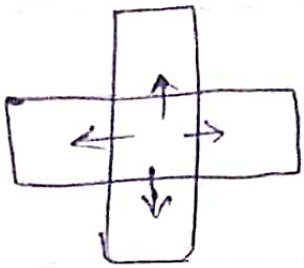
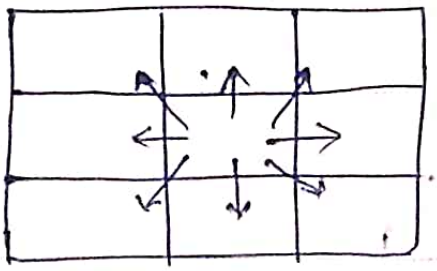
- What do we mean by Neighbours?
Correctedness: There are 2 types of correctedness.

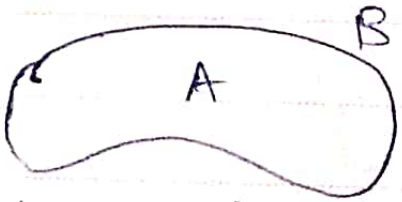
1. 4 correctedness (4-C): It has 4 pixels at its sides.



11. 8 correctedness (8-C): It has 8 pixels.



- Jordan's curve theorem: if you have a curve, a closed curve, that curve must divide the region up into 2 connected region.



In the above image we can see that A is in a closed region & B in a separate region. Therefore they are violating Jordan's curve theorem.

4-C →

B_1	O_1	B_1
O_4	B_2	O_2
B_1	O_3	B_1

Holes without a closed loop.

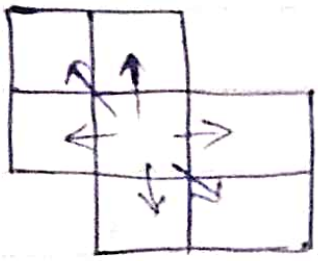
8-C →

B	O	B
O	B	O
B	O	B

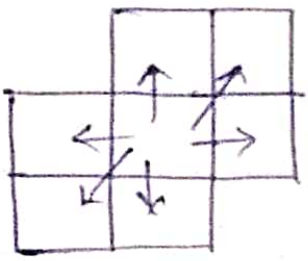
Holes ~~with~~ background having closed loop.

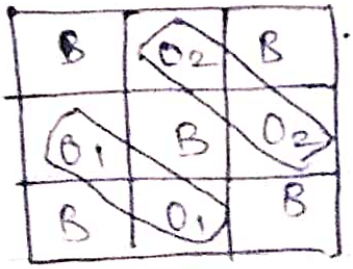
Introduction Asymmetry:

6 - correctedness (6-C):



OR





Two different line segments

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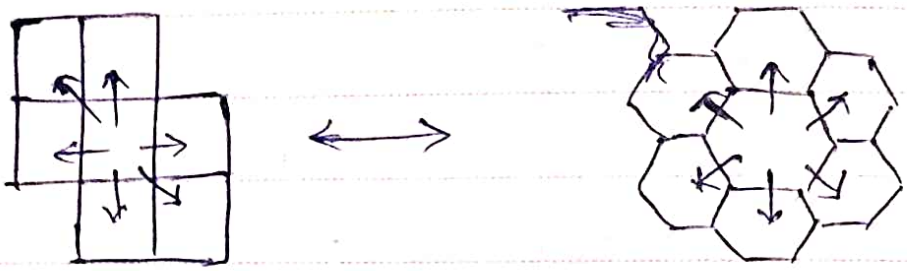
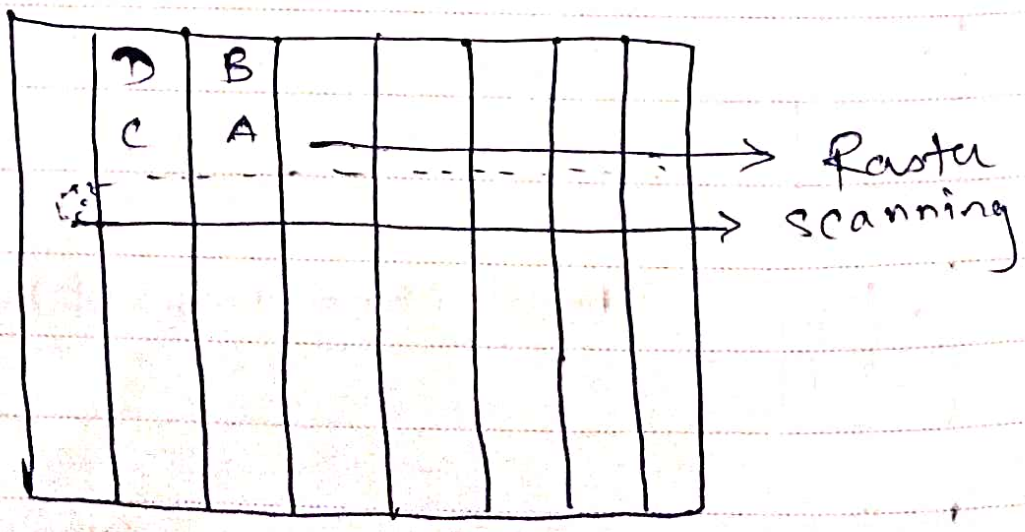
Hexagonal Tesselation:



The ~~C~~ assymetric square grids looks like a hexagonal grid. In hexagonal grids you have pixels, & have well defineded neighbours.
Image sensors donot capture images on hexagonal grids. Therefore images are square grids.

- Sequential labeling Algorithm:



An algorithm which is more efficient & more elegant

We are going to more horizontally, & when we get to the end, we come back & go to the next row. This is called raster scanning an image.

X	X
X	0

→ label(A) = 'background'

0	0
0	1

→ label(A) = new label.

D	X
X	1

→ label(A) = label(D)

C	C
C	1

→ label(A) = label(C)

0	B
0	1

→ label(A) = label(B)

0	B
C	1

→ If, label(B) = label(C)
then, label(A) = label(C)

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If label (B) not equal to label (C) :
create Equivalence table
- lable (B) = label (C)
- Assign label (A) = label (B)