# Contours of an object

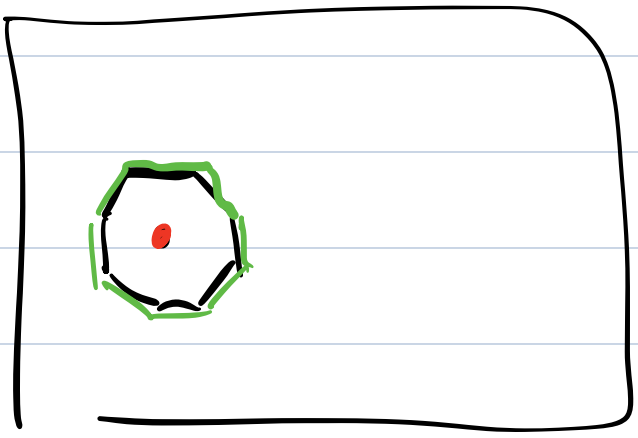
- an edge - in an image is a significant local change in the image in terms of intensity / brightness

- edges may not be closed or connected.

Contours - are curves / lines / points joining all continuous points along the boundary of an object.

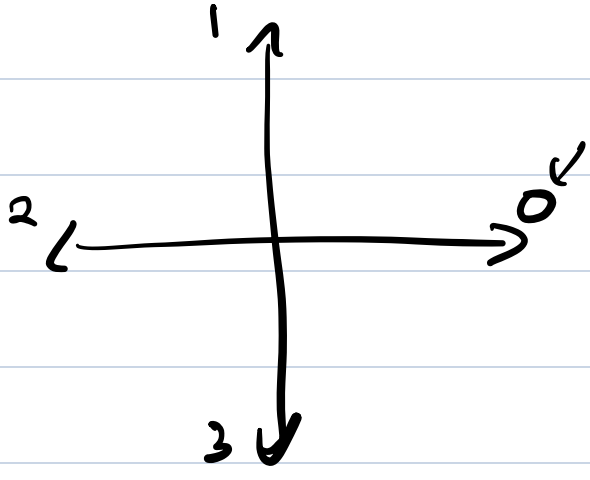
- they are always closed and connected.

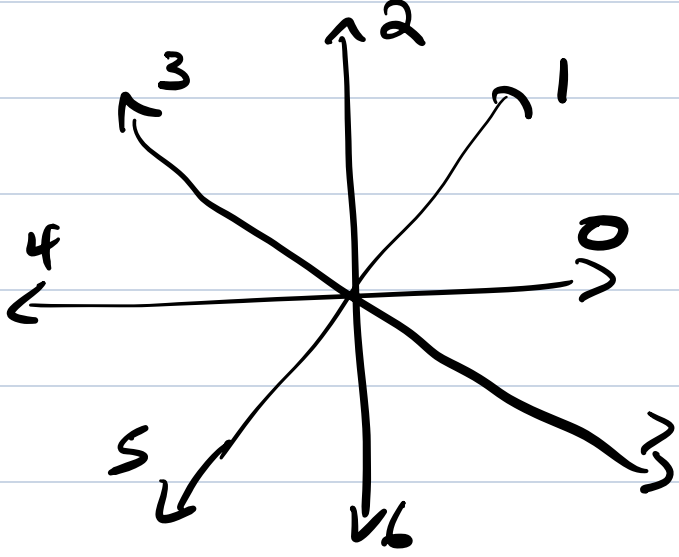
- we can trace contours with chain codes.



- Chain codes - indicates the direction of tracing along the boundary of an object.

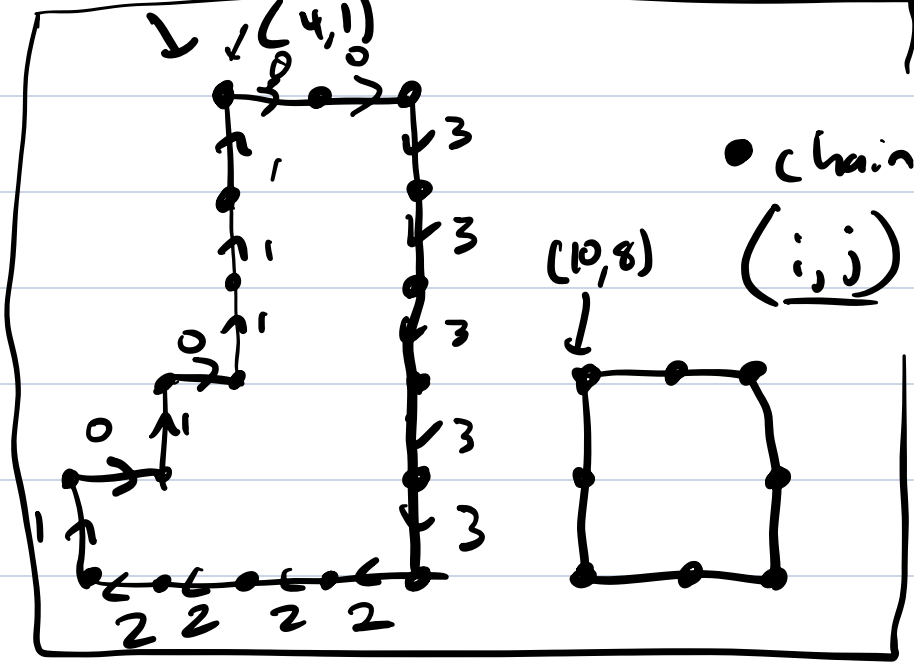
4 - directional and 8 - directional




- Chain codes start in the top left of an object.

start:




- chain code for object
- (i,j) ← starting point is going to be a list/array of directional points.

(4,1) = [0, 0, 3, 3, 3, 3, 3, 2, 2, 2, 2, 1, 0, 1, 0, 1, 1, 1]

start

- each index represent 1 pixel.

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- Steps to find contours.

**Step 1** → **binarize** the image.

1) * Convert to grayscale
   - pick a threshold

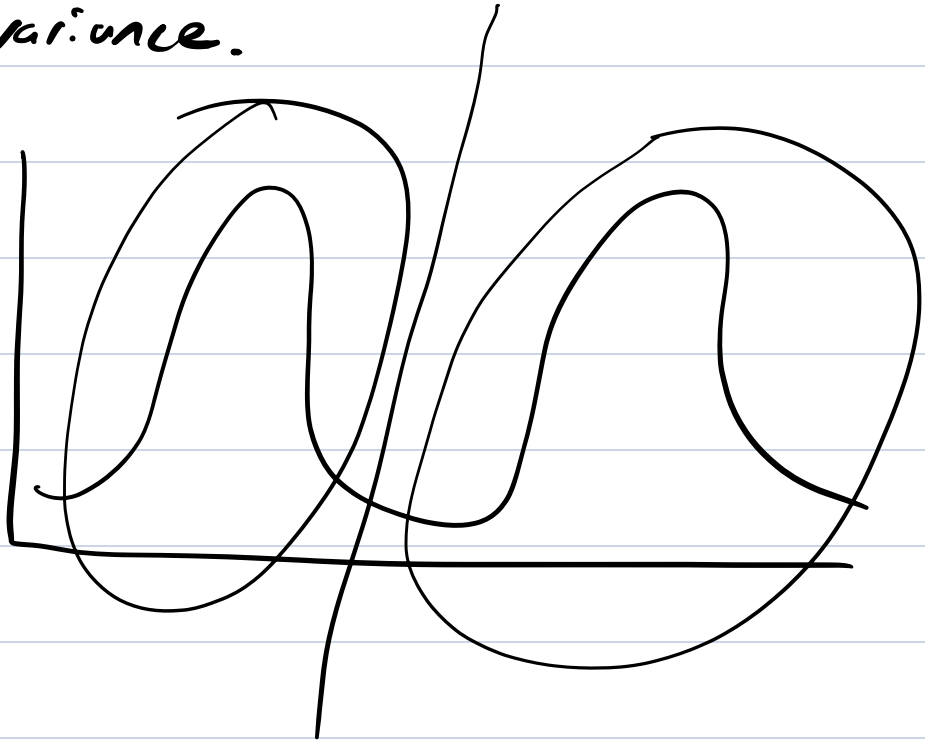
based on the histogram.

- anything above the threshold set to white
- anything below → black.

## 2) Otsu's threshold method.

- used to seprate an image into a foreground and background.

- uses the histogram to find an optimal threshold with a maximum inter-class variance.



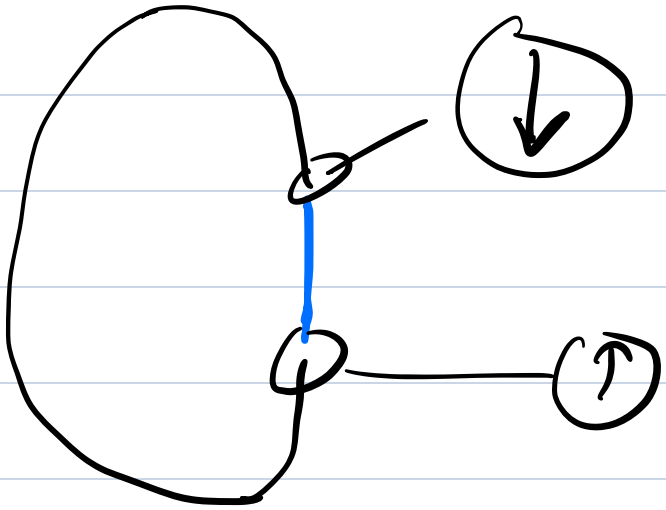
# Step 2 - Contour Extraction

- is a bounding line displaying an object

- Can use edge detection on a binary image.

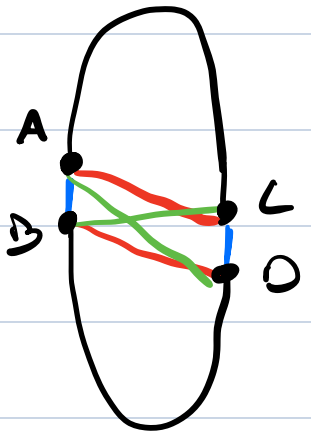
- Edge detection can results in non-connected loops.

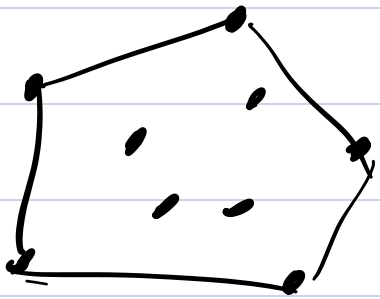
- Finding continous edges can be tricky



- This can be done by comparing orientation / direction of

edges.



Step 3 - Create a chain code around the edges. Starting in the top left, moving right.

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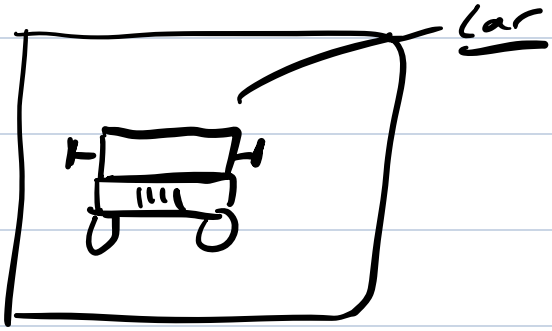
Bounding boxes - a shape that encloses an object.




- Find the contour of an object
  - min (x, and y)
  - max (x and y)
  - use those to draw

the bounding box.