

Rob is a set of pixels that share some property and are connected (can trace a path from one member to all others).

Pixel-connectivity

Four-connectivity - We assume a central pixel is only connected to its four nearest neighbours (north, east, south and west)

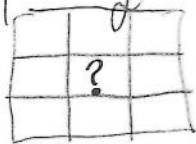
Eight-connectivity - We assume a central pixel may be connected to the four nearest neighbours (north, east, south and west) and the four next nearest neighbours (likely NE, SE, SW, NW but not always)

We should be flexible in choosing a connectivity model, use whichever is best for the current situation.

Connected Component Analysis (CCA)

- A contiguous set of pixels that share some property is known as a **connected component**.
For example, the regions of a binary image are each connected components.
The process of finding these components is known as CCA.

Algorithm



i) First pass

Work from left to right and top to bottom

1. If 0 neighbours have a label
Pixel receives the next free label;
2. If 1 or more neighbours have the same label
Pixel receives same label;
3. If 2 or more neighbours have different labels
Pixel receives one label, equivalence is recorded

ii) Second pass

Work from left to right and top to bottom

Relabel all equivalent labels