

Image Topology

Yih-Lon Lin (林義隆)

Associate Professor,

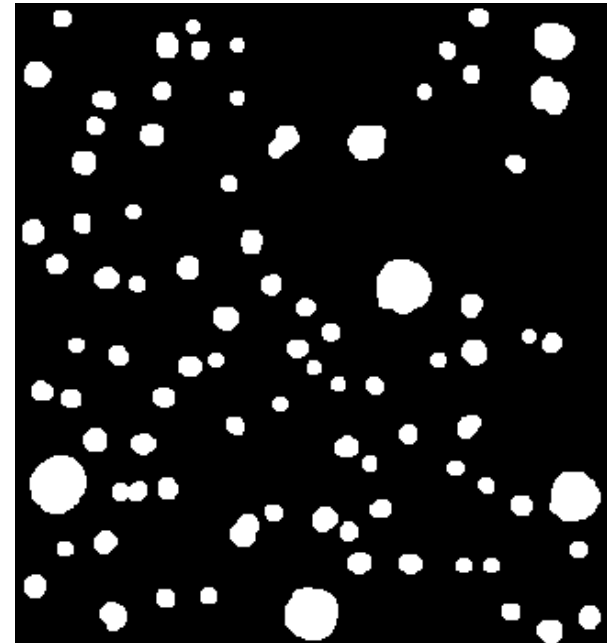
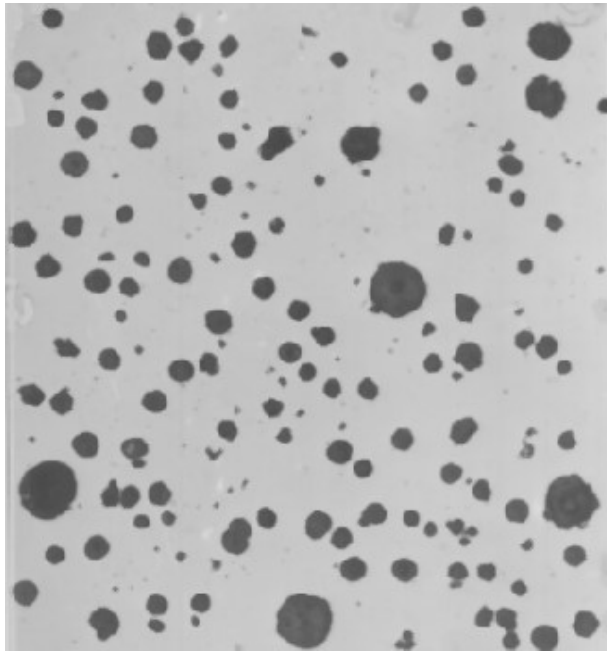
**Department of Computer Science and Information Engineering,
National Yunlin University of Science and Technology**



國立雲林科技大學

National Yunlin University of Science and Technology

How many blobs?

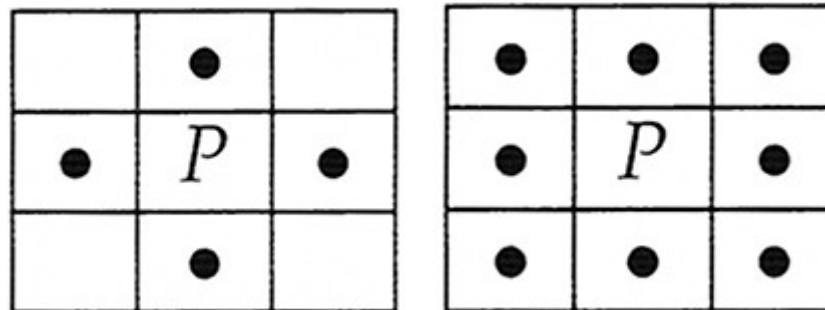


How many blobs?

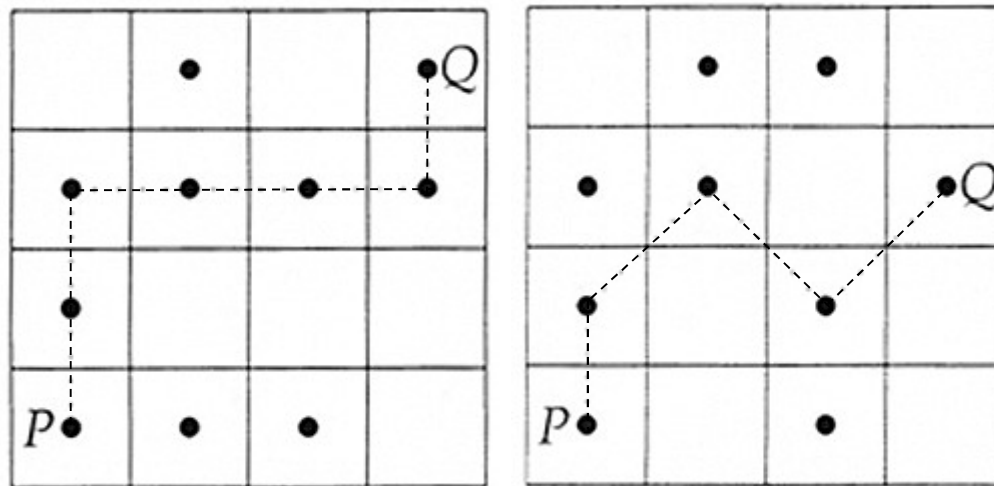


Neighbors and Adjacency

- 4-adjacent and 8-adjacent



Paths and Components



Component Labeling

	<i>u</i>	
<i>l</i>	<i>p</i>	

	•		
•	•		•
		•	•
	•	•	

<i>d</i>	<i>u</i>	<i>e</i>
<i>l</i>	<i>p</i>	



Component Labeling

- Step 1:

	•1		
•	•		•
		•	•
	•	•	

	•1		
•2	•		•
		•	•
	•	•	

	•1		
•2	•1		•
		•	•
	•	•	

	•1		
•2	•1		•3
		•	•
	•	•	

	•1		
•2	•1		•3
		•4	•3
	•	•	

	•1		
•2	•1		•3
		•4	•3
	•5	•4	



Component Labeling

- Step 2:

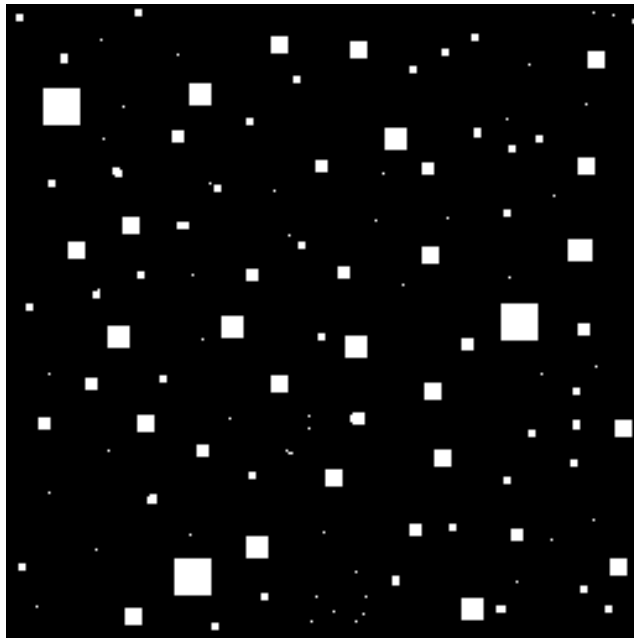
$\{1, 2\}$ and $\{3, 4, 5\}$.

- Step 3:

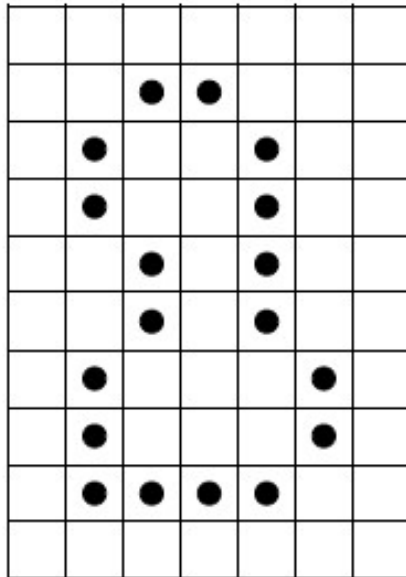
	•1		
•1	•1		•2
		•2	•2
	•2	•2	



Component Labeling



Fill



We thus create a sequence

$$\{p\} = X_0, X_1, X_2, \dots, X_k = X_{k+1}$$

for which

$$X_n = (X_{n-1} \oplus B) \cap \overline{A}.$$

Finally $X_k \cup A$ is the filled region.

\overline{A} :

