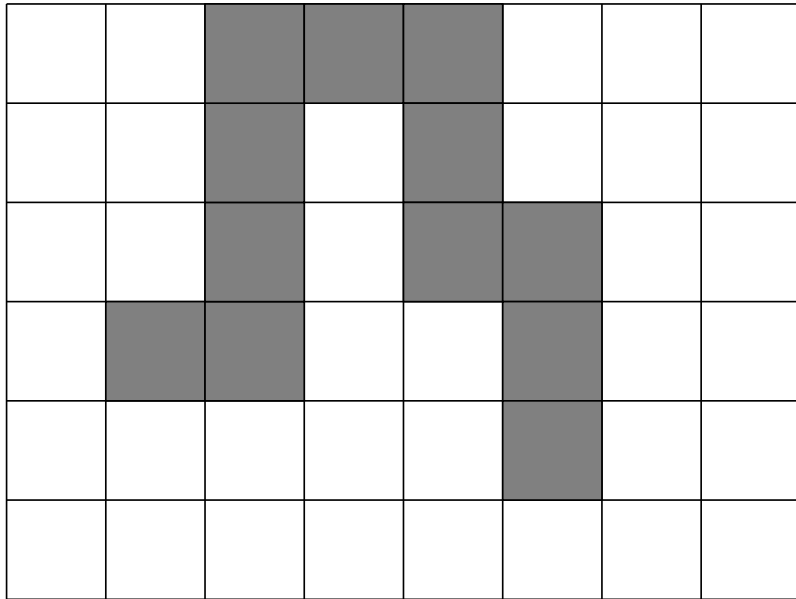
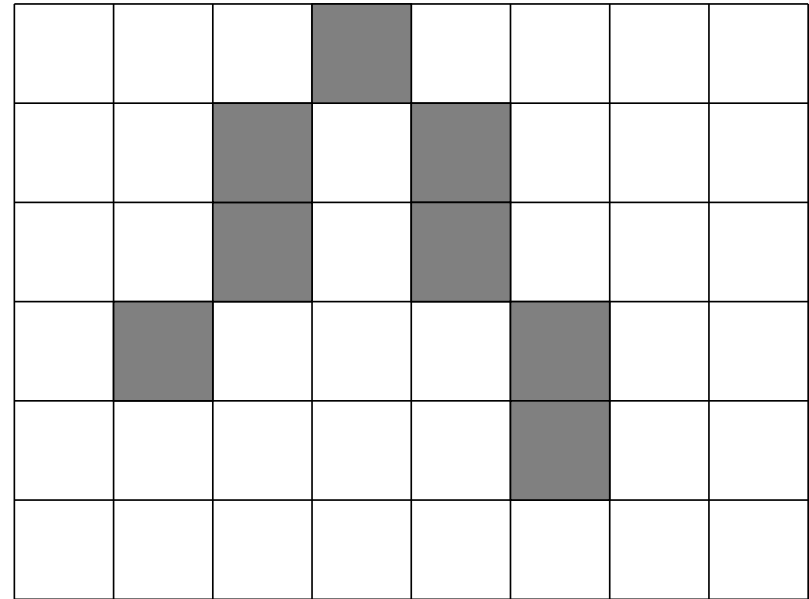


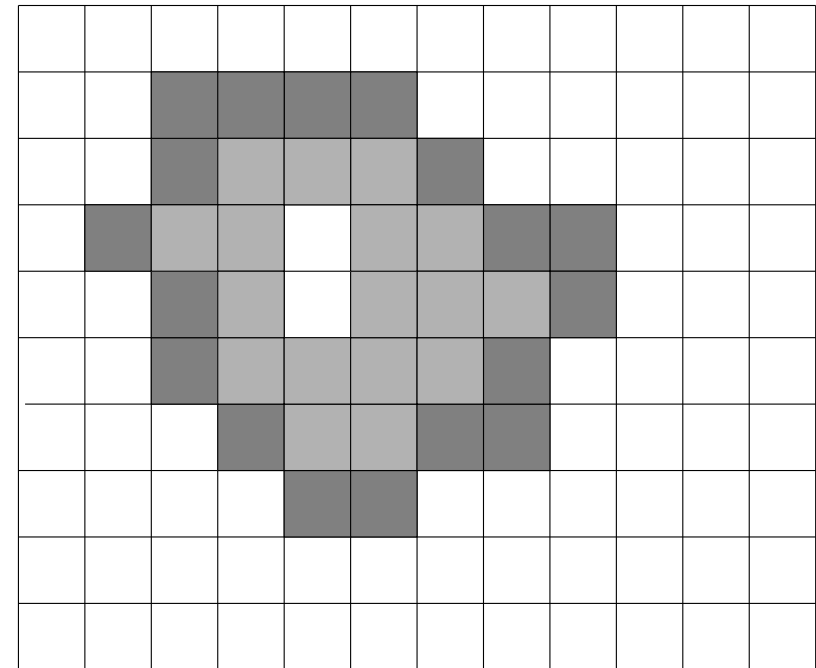
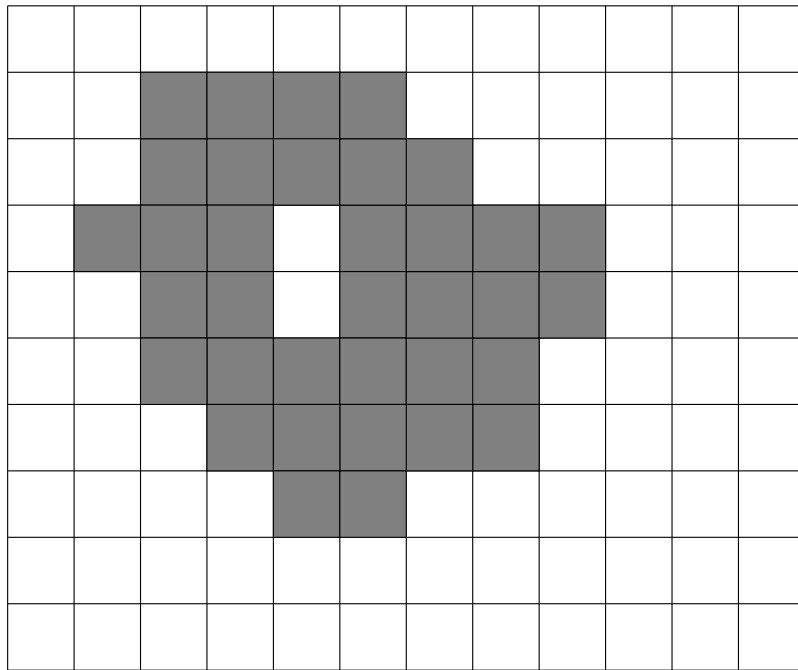
		1	1								
		1	1	1							
		1	1	1				3	3		
								3	3		
								3	3		
		4	4					2	2		
		4	4	4				2	2		



4 connected



8 connected



 interior

 Grenze

---

## Recursive Connected Components Algorithm

*initialize all pixels as unlabeled*

`L := 0;`

`for alle Zeilen`

`for alle Spalten`

`if pixel is 1  $\wedge$  pixel is unlabeled then`

`L++;`

`labelIt( pixel, L)`

`fi`

`endfor`

`endfor`

### **labelIt( pixel, L)**

*label pixel as L*

`for qixel is neighbor of pixel`

`if qixel is 1  $\wedge$  qixel is unlabeled then`

`labelIt( qixel, L)`

`fi`

`endfor`

---

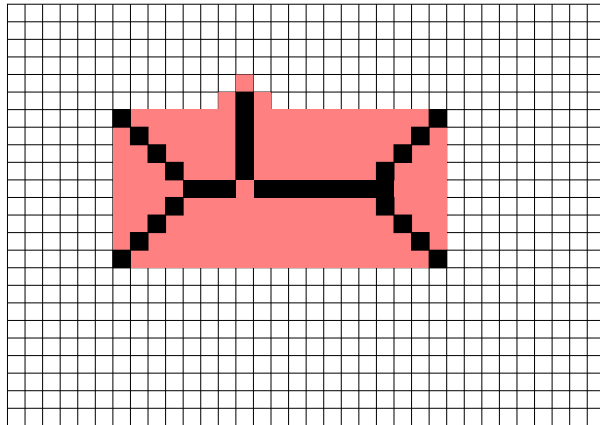
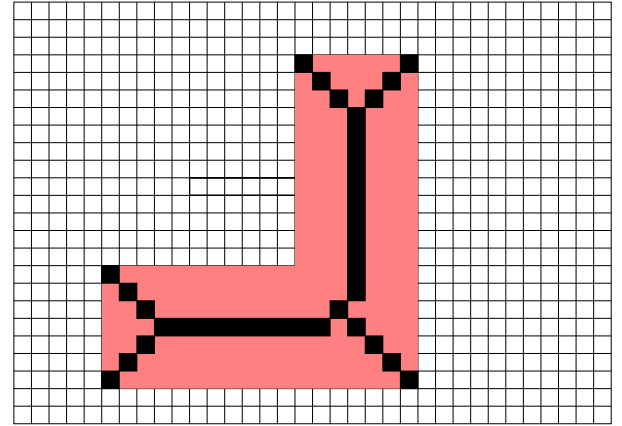
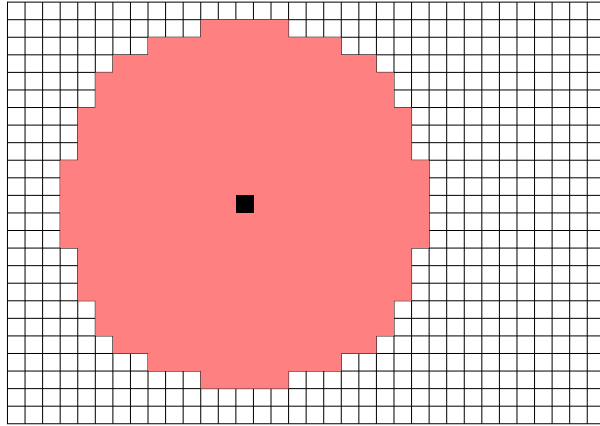
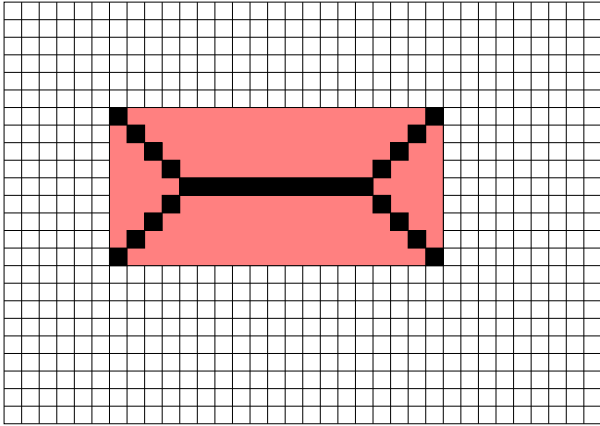
## Sequential Connected Components

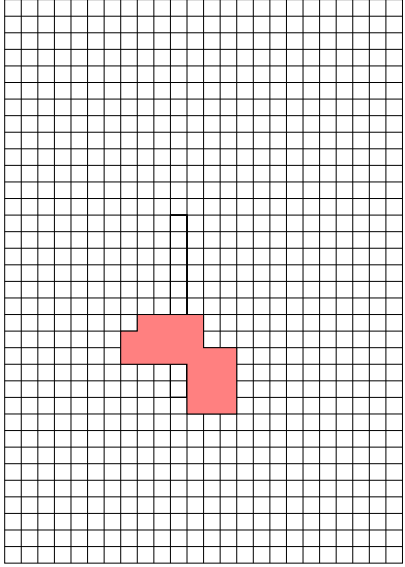
```
initialize empty equivalence table
for alle Zeilen (von oben nach unten)
  for alle Spalten (von links nach rechts)
    if pixel is 1 then
      if either upper or left neighbors has label then
        copy the label
      else if both neighbors have same label then
        copy the label
      else if both neighbors have different label then
        copy the upper neighbors label
        copy enter the labels in the equivalence table
      else
        assign new label to this pixel
        enter this label in the equivalence table
    fi
  fi
endfor
endfor
```

---

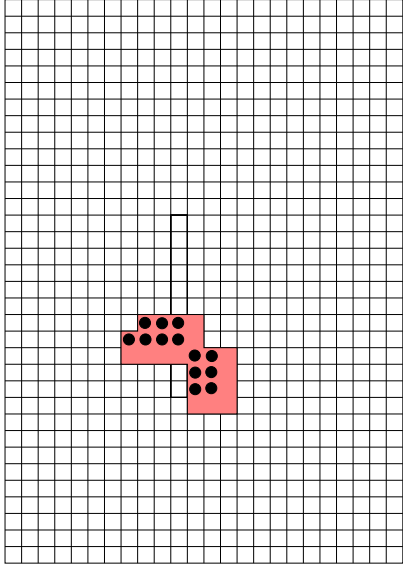
Find the lowest label for each equivalent set in the  
equivalence table

Scan the picture and replace each label by the lowest label  
in its equivalent set

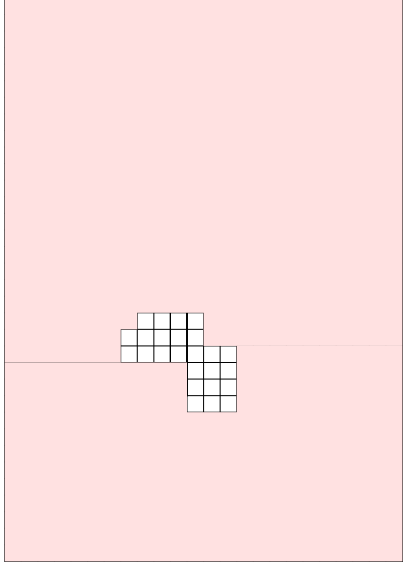




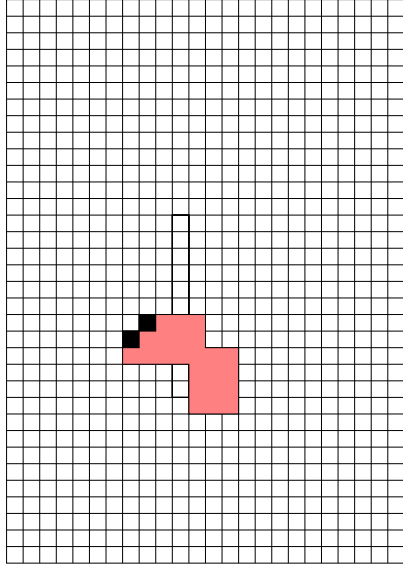
$A$



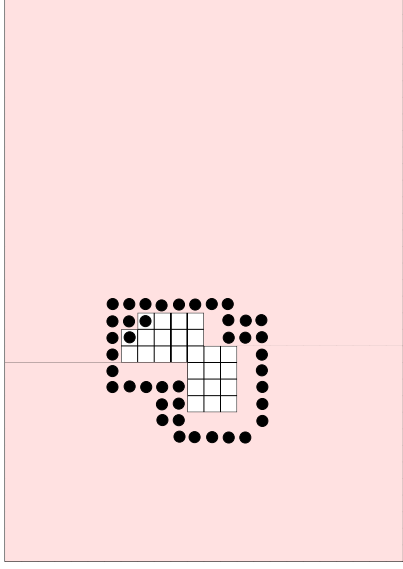
$A^c$



$A \ominus J$



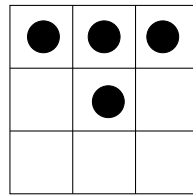
$A^c \ominus K$



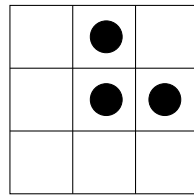
$A \otimes (J, K)$

Abbildung 1: Beispiel fuer hit-and-miss: upper-right-hand corner

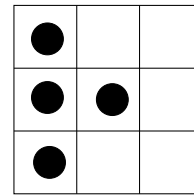




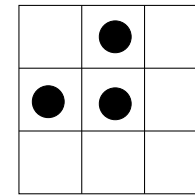
J1



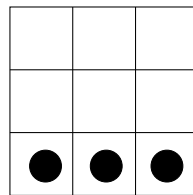
J2



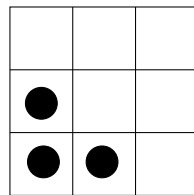
J3



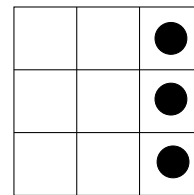
J4



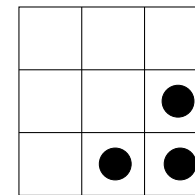
K1



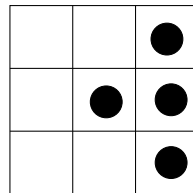
K2



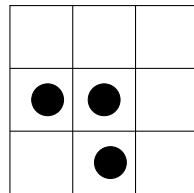
K3



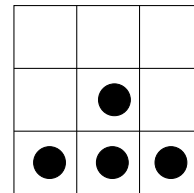
K4



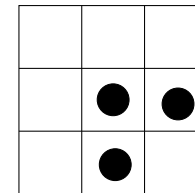
J5



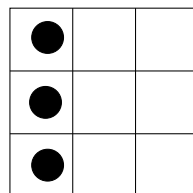
J6



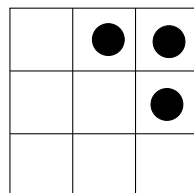
J7



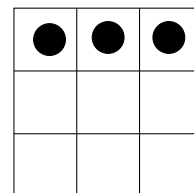
J8



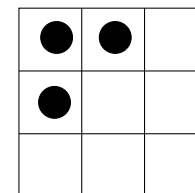
K5



K6



K7



K8

